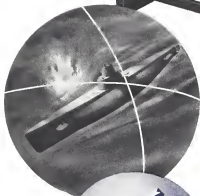


AVIATION WEEK

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**HE'S SINKING
AN UNSEEN
SUB**



DESIGN ENGINEERS started with the latest electronic gear to seek a submerged sub and the armament to sink it. Around this mass, they created an aircraft. With slide-rule and calculator, they flew her on paper.

From these flights in figures, and from models in wind tunnels, came data demanding change. Often formulae gave the answer, often the ingenuity of Grumman specialists in aerodynamics, stress, weight control, metallurgy, and production.

They detailed her anatomy, until all her thousands of parts were ink lines and numbers. These became metal, hand cut and formed with precision. Carefully the first experimental model was built.

But long before the Grumman S2F-1 flew and confirmed their figures on paper, they were busy on a revolution

Grumman salutes National Engineers Week

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100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%



"SANDWICH MODEL" OFFERS EXTREME COMPACTNESS

Manufactured in an extreme, non-aerothermal environment, this type of hose is extremely compact, of lighter weight. Engines can be used. This represents a new use of an older material. Distribution and maintenance are simplified, since it is fitted to engine. Maximum length of hose, even at extremely high altitudes.



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unit is suited to engine mounts
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"SANDWICH MODEL" OFFERS

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**8 miles high
without bubble trouble**

THE GASEOUS BY-PRODUCTS of the fuel cell are pumped into the Northrup Denison gas turbine, which is used to supply power to the ship. The turbine is 100 ft in diameter and weighs 100,000 lb. The turbine is 100 ft in diameter and weighs 100,000 lb. The turbine is 100 ft in diameter and weighs 100,000 lb.

[illegible]

to form the walking cube. When this rule arrives, it works like blowing up a paper bag—low pressure brings it to its full expansion and diameter stretch the fabric enough to notice it. Dangerous stretching of tube wall (like blowing on a sea balloon) is eliminated.

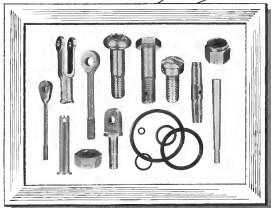
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Boeing, Chance Vought-Curtis, North American Sabre and other airplane besides the Northrop Stinson.

This new type unit is one of many developments in a section that has come from B. F. Goodrich rubber, resins and engineering. Other revision products include cars, wheels and bearings based rubber, De Iroco, Avtrax, Plastack adhesives, Pressure Sealing Zippers, fuel cells, Kivexol, accessories. To B. F. Goodrich Company, Akron, Ohio.

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NEWS DIGEST

Domestic

Despite CAA administrative Ford B Lee last week appeared to have a clear track for the Eisenhower nomination as administrator, and announcement of the nomination was expected momentarily. Meanwhile, appointment of the 64th secretary of Civil Aeronautics Board was expected to be made shortly, with former Rep. Harman D. Dorn, Jr., of Pennsylvania apparently favored. Dorn has strong Republican connections, including from Sen. James H. Dool and former GOP national chairman Hugh Scott.

More than 1,500 working C-124B CIO production workers returned to their jobs last week in Fairchild Engine Division plants at Farmingdale and Valley Stream, N. Y., ending a 25-day-old work strike. A new labor contract was ratified, with pay increases ranging from 10 to 15 cents an hour and other benefits. Company refused to agree to a union shop.

Wayne Major Airport in Detroit may become the state's first airport with naturally air conditioned passenger terminals, hangars and shops. A hypothesis of negotiations with the International Salt Co. for mineral rights under the field is a proposal that air be brought up from a salt mine through shafts and circulated through airport buildings—dropping temperature to an estimated 62 deg.

Cowen's new turbo-prop-powered RTV flying boat, Indian large airplane to be developed, has been named the Truwind.

A British Spitfire Mark 24 flown by an American pilot in the only U. S. entry in the 400 mph speed class at the 1953 International Air Race, London to Christchurch, New Zealand, Oct. 18-Nov. 12. Flying, president of American Aircraft Corp., Teaneck, N. J., will pilot the World War II fighter plane.

Wage increases that will add an estimated \$700,000 a year to General's San Diego Division were granted by a labor contract signed last month with the Engineers and Architects Assn. (E.A.A.). In June, General's Ft. Worth Division reports production of the B-56, an engine booster (the new model B-56 subcontractor and supplier of parts and service).

Robert N. Eaton, aircraft test engineer and hydraulic engineering expert, has retired as chief of the hydraulics sec-



PRODUCTION CHASE C-124B Air Force transport will vary only slightly from the prototype that still's sketch reveals. Most noticeable difference is a new spread-off fuselage and rubber. The line, in cooperation with Kaiser-Frazer, will turn out a variable quantity of C-124Bs for small transport.

tion of the National Bureau of Standards.

House E. Schneider, assistant vice president of Western Gas Works, Lynwood, Calif., died Feb. 2.

Financial

Continental Motors Corp., Muncie, Mich., reports record high sales totaling \$264,219,000, net earnings of \$6,116,871 during the last full year.

Lockheed Aircraft Corp., Burbank, will pay a 37.9-cent dividend May 14 on each capital stock share to stockholders of record Feb. 24.

International

A 1,500-epoch, gyroscopic fighter plane capable of vertical takeoff is in the planning stage at Aero-General's Malibu, Calif., plant, reports from Canada. The new flying wing type aircraft is expected to have a passenger that will provide remote control control cockpit. Air Vice Marshal Douglas Smith, chief of Royal Canadian Air Force technical services, says the RCAF is "giving preliminary consideration to

use. Forward by two F-86s. R2100-91W of 1,500 takeoff horsepower each, the new plane will have a top speed in the neighborhood of 240 mph and a range of some 2,000 mi. First production model has been completed at Chrysler's West Trenton, N. J., plant.

a project of the nation, but we have not gone beyond the thinking-out loud stage."

Aero Canada reports completion of official type-tests of the first Canadian jet engines, the Canada E for CF-103 aircraft and the Canada 10 for F-86 Sabers being built by Canada.

British Overseas Airways Corp. will begin Lockheed jet plane flights Apr. 3 between London and Tokyo, reducing time for the 10,200 mi. trip to 13 hr.

American Express Inter-Africa flights will begin scheduled trans-African flights next year using Lockheed 4 Lockheed Super Constellation and trim.

Royal Canadian Air Force expenditure for 1953-54 fiscal year are estimated at \$916 million, nearly half of the National Defense Department's proposed budget of \$2,000,795,000. Of the RCAF's total funds, \$413 million is earmarked for jet fighters.

Canadian Defense Minister Brooke Claxton arranged delivery this month in Montreal of the first of 500 T-35 jet trainers ordered by the RCAF from Canada, Ltd.

Sier-Bath PRECISION GEARS



PROVEN ACCURACY

PROVEN BY TEST
on the latest gear-shifting
equipment. This gear shifter
has to have a "Red Line"
indicator which records
character, location and
magnitude of the different
shifts.

FOR THE AIRCRAFT INDUSTRY



General Electric JEF-54-32 engine, cut-away model



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in today's budget aircraft. For example, the 787 uses composite materials and is built by General Electric JET-2012 engine, which powers the two aircraft models at full, among many others.

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Also manufacturers of toys and "Beyblade" battery
 power, and the life size Great Wall

WHO'S WHERE

In the Front Office

Dr. Arthur A. Brown has been appointed vice president of Biocra Technica, Inc., a firm in Tegucigalpa, Tegucigalpa, Honduras. He served during 1953-52 as chairman of the INCA subcommittee on ring problems and himself was a test engineer at Ford & Whitney. He holds

Dwight H. Huest, former engineer at Sperry Gyroscopes and Boulder Aviation Corp., has been named a vice president of General Corp., New York.

Robert H. Whorson has been appointed assistant to the president of Theta Chi Lambda.

Changes

Philip V. Matten, Scranton, Pa., attorney; Henry A. Salkinbath, newspaper publisher at Redwood, Pa.; W. J. Stotter Jr., president of Civil Operations Company Co., Greensburg, Pa.; and William R. Withaker, president of Williamsport (Pa.) Narrows Fibers Co. were elected to the Allegheny Anchor board of directors during a special meeting here recently in Washington, D. C.

James B. Edwards, chief engineer at Hiller Helicopter, Palo Alto, Calif., has been elected to the firm's board of directors.

William E. Lake has been appointed controller of Carlin Wright Corp., Wood Ridge, N. J.

C. M. Chasas, president of American Latex Products Corp., has been named to the board of Dayton Rubber Co.

William W. Taylor has been promoted to acting general manager of Money Analysis, Inc., Knoxville, Tenn.

T. K. Casselas has been appointed chief electromechanical engineer at Lear, Inc., Grand Rapids, Mich.

E. A. Erickson is new assistant chief engineer of Gardner-Astrand Corp., Alton, Ill. Other new appointments include: C. J. Fleming, manager Fielded Aircraft Engines in Denver; W. G. E. Moorhead, manager

product engineering. D. W. Smith, manager submarine modifications design, R. E. Anthony, manager of standard design, R. E. Ziegler, manager special engineering and preliminary design, R. L. Rivascausa, manager engineering technical service, and R. C. Hagen, manager physical models regarding subminiature. In General Electric's business office, J. L. Gashel has been promoted to manager of the Finance Division. H. F. Hueb, manager of accounting, and R. C. Blackman, manager of records and public document.

Robert S. Fritzen has been appointed manager of Solar Aircraft's Industrial Relations Division at the San Diego plant.

J. Wallace Coon is new personnel manager of Downer Helicopters, Inc., Danbury, Conn.

William M. Dallas has been named manager of manufacturing control at Texaco Aircraft Corp., Dallas, Tex. His contact is Robert E. Lewis.

Fabry Vincent, former chief of adult education and machinery at Kaiser-Franz.

(Continued on page 30)

INDUSTRY OBSERVER

► Douglas XF-4D Skyway is a supersonic fighter, according to Rear Adm "Jack" Menn, Deputy Chief of the Navy's Bureau of Aeronautics. Adm Menn said the XF-4D still is under-concerned but with "proper" paracrafts would easily fly above Mach 2. Skyway first flew with Adm Menn 195, then with the Westinghouse J40-6, a dualised (7,000-lb.-thrust) version of the J40-5 (15,000-lb. thrust) originally scheduled for the plane. Navy now is considering a shift to another aircraft.

► McDonnell Aircraft F301 Demon has made more than 100 test flights and logged more than 40 hr in the air. The Demon also is being used to develop a wing-mounted 140 and a shift to the Alliance (7) is in progress for production version to be built by McDonnell and Tercen.

► Production intent of the North American A31, powered by two Allison T40 turboprops, now appears dim. Navy frets its original provisions regarding operation of big jet loaders from carriers has been disrupted and the big turboprop-powered bomber planned for the interim will not be necessary.

► Next round of flight tests on the Dragage AID turboprop-powered Skyhawk probably will determine if present plans for large-scale production of this aircraft will be curtailed. Skyhawk will take to the air with an Allison T403, nonproduction version of the turboprop engine, in an effort to determine whether earlier "bug" in the powerplant have been eliminated.

• Although the last Vought Corsair (F-4U) was delivered last month, Navy plans to continue production of the AU ground-support version of the Corsair for some time. Congressional criticism of continued Navy purchase of piston-powered fighters was a factor in changing the Corsair designation to AU for future production.

* Yemen has successfully field 2.75-in. rockets from its T-35 Bushmaster. Small order for T-35s now on USAF books is actually for Saudi Arabia under MSA contract. USAF has no current plans to use the T-35.

• Evaluation of new I/OO nav military navigation system, designed to provide military aircraft with bearing and distance information similar to that obtained from CAN's coverage; and DME, is scheduled to begin as soon as prototype equipment, now under construction, are completed.

► Canadian sports sty that it looks as if the assignment, under which Jacqueline Cochran was to fly an Orend-powered Canadian-built P-86 Sabre for a try at the world's absolute speed record, has been cancelled.

▲ Aaron Johnson, National Airlines' pilot, who was the 1948 Thompson Trophy race at Cleveland in a stripped-down North American P-51 Mustang, is pointing the same plane with additional aerodynamic modifications for further cleanup, in preparation for a world's propeller plane speed try at near sea level over a sand beach near Miami. Record he is shooting for was set in 1939 by Filton Wrenell, German pilot who flew a Messerschmitt 109R at 409.94 mph.

► Ultimate solution to the aircraft fastener standardization problem now plaguing the aircraft industry probably will be a single, new type fastener which will make obsolete all current types. New fastener requirements are currently being drafted by the industry and military but new type of equipment is at least several years away.

► North Aircraft has set up a new expediting committee to push pending two details of the big USAF T-36A two-engine piston-engine navigation trainer.

★ Watch for Beech Aircraft to come through with the small primary trainer contract, for its T-34 Mentor development of the Romanian civilian plane. Romanian aircraft are a substantial military order in all set for Beech.

ODM Shuffles Aircraft Production Setup

- New group coordinates all defense output.
- Program is designed to keep production high.

By Alexander McHenry

A new Washington defense production setup designed to handle aircraft and electronics programs more closely coordinated with other defense production programs is being formed last week by the Office of Defense Mobilization.

It is composed of all members of the Aircraft Production Board and Electronics Production Board, which had been handling production problems for their industries.

New men for the aircraft and electronics industries to date are:

- **John Pennington**, coordinator of aircraft production.
- **Julius Siegel**, coordinator of electronics production.

They are at a crucial stage with three major considerations of Aircraft Energy Conversion Council, tools, and special products and construction programs in the newly expanded production division of ODM, headed by Louis A. Glavin.

• **Felix Gieseler-Wilkins**, who serves as chairman of the Production Executive Committee, policy-making body that includes the Assistant Secretary of Commerce, a representative of the Department of Defense, representatives of the Munitions Board, Air Force, Navy and Army, and additional representatives from federal agencies as needed.

• **Industry Representatives**—The new staff is also to be in close and constant communication with the industry representatives at the policy level would be an important factor in keeping the program realistic and workable.

• **New Staff**—Col. N. W. Rowinski, Air Force Civil Service Aide, and an Army representative not yet assigned will move as liaison between the production division and their respective services on day-to-day problems.

While the new setup still is in a formative stage and can be modified, it already reflects the thinking

ODM's New Production Division . . .

Division director and chairman of Production Executive Committee—**James A. Glavin**.

Liaison—**Col. N. W. Rowinski**, Navy, Col. Samuel Holt, Air Force, Army representative.

Coordinator, aircraft production—**John Pennington**, four assistants: V. B. Lee, assistant.

Coordinator, electronics production—**Julius Siegel**, Assistant R. A. Van Velsburg, A. L. McHenry, secretary.

Coordinator, Atomic Energy Commission—**Felix Gieseler**, assistant—**Col. Louis Koenig**, USAF.

Coordinator, special products and construction program—**J. H. Schuman**.

Peter making arrangements for defense production evocation committee. Division director is committee chairman and members include: Assistant Secretary of Commerce, representative of Department of Defense designated by Secretary of Defense, representatives of Munitions Board, Navy, Army and Air Force, additional representatives of other government agencies, and representatives of industry as the division may designate.

of President Eisenhower's new Administration to centralize and coordinate the government's mobilization effort.

Analysis indicates the Aircraft Production Board has, generally speaking, accomplished the job it was assigned to do and has served its purpose of helping get the aircraft industry geared to the defense mobilization effort.

Glavin for APB accomplishments were mainly to handle 1949-1950. But, that Production Board chief who is assigned last March to return to a job as a division manager of General Motors Corp., and to his assistant Allen Rowinski, for staff work, under Glavin and subsequent handling of APB programs along the policy line established by Glavin. Rowinski's job was eliminated in the reorganization, and he is taking a vacation.

Indications are that the new coordinator's office will be a new staff group, possibly, trouble-shooting on short-range production problems under the eye of the Controlled Materials Plan Executive Committee.

Willians and his division is being set up to give service to the industry agencies, and if they do not think it is worthwhile after a trial period in its new status, "we can take the whole thing and go home."

• **No Assistant Backyard**—Pennington told Aviation Week he was a ship and production specialist but not an aircraft man. His principal previous industry experience has been in general supervisory and management and equipment for Texas Pacific Railroad. Defense. He served with the railroad 22

years in various posts. Pennington came to Washington last June for special defense production assignments, most of which concerned with the truck program used for postal job.

He expects to have four assistants in production operations in the aircraft field. Their assignments will be:

- **Defense** including wing, tail, large fuselage, surface controls, fuselage and tail tools.
- **Powerplant** including engine and accessories, propeller and auxiliary fuel systems, exhaust tools, lubrication and hydraulic systems, induction and fuel-air mix.
- **Electrical and electronic** systems, control systems, instruments, communications, electrical system, structure, control, engine, engine controls and fuel provision controls.
- **Special assignments**—Pennington will be invited specialists with special shop production experience and that special units will be announced in a short time.

• **Machine Tool**—Rowinski—Col. Louis Koenig, moved coordinator of machine tools for the Production Division, was named by the Air Force to the new special defense assignments to work on machine tool problems and is reported as an experienced administrator in this field.

Willians said he is holding the production division post temporarily to organize the division and is looking for a man to fill the post when Willians returns to his former job as assistant to Robt. Trapp, Acting Assistant Director ODM.

• **CMP Status**—Clarifying the new arrangement for the Controlled Materials Plan and "open coding," Willians said of CMP policy outstanding must be worked before the production of these controlled materials—steel, aluminum and copper—can accept any limited open-ended orders.

Aircraft industry officials speculated, however, that the new arrangement probably will mean aircraft, engine and component manufacturers holding back will have to place all their orders for each quarter instead of holding back some for later placement. The hold-back practice has been a cause of frequent conflict between industry and government, since it occasionally resulted in some materials being held up throughout a quarter and not being used.

On the other hand, the aircraft industry position was based on efforts to keep manufacturing and inventory down and to be able to place the output of new shifts within a quarter.

Willians described the former setup with Aircraft Production Board, Electronics Production Board, and Facilities Review Board as organizations that had many of the same members as the Production Executive Committee. He said the three boards also had duplicating functions. The new organization is "building a new staff and a new Production Executive Committee."

The new Production Division director and electronics action problems would be handled under the chief, mission and aviation coordination, that mechanical problems for motor would be handled by the machine tool specialist in coordination with the aircraft coordinator, and that generally these would be less "uncoordinated" independent but duplicating action locations.

• **After last 1951**—The materials control program after June 30 still is not clear, except for plans to set that industry needs are filled and to take up of some other control production, Willians said.

What will follow this latter category still is to be spelled out, but this is where the new materials may be of most concern to the aircraft industry. Possible transport aircraft will come in for materials on a priority basis when needed, but this has not yet been put down in black and white.

Other civilian aircraft, affected by a limited number of CMP limits, may be forced upon by military branches for materials, unless specific new arrangements can be made.

The civil aviation aircraft industry probably will be awarded materials allocation on a basis of military branch transportation and material requirements, along with a move to keep a

limited production of light aircraft going for all the other production by the armed services. Presently this processing still holds, but industry may be required to give up all even going to make it.

C-46 Safety

- Recertification tests slated for all models.
- New CAB regulation cuts plane's weight limits.

Civil Aeronautics Board will cut the maximum operating weight limit for C-46 passenger operation by 700 lb., effective April 1. But CAB's new special safety regulation reduces the load only as planes get up to speed in the "climb" phase of the flight. The standard maximum weight for its standard aircraft.

The Board is using the "temporary" special safety regulation, against the new weight limit, the plane will be recertified by Dec. 31, 1953—meeting "in full" the strict load requirements of Part 46 (transport category) of the Civil Air Regulations. The plane currently is certified under a non-transport regulation.

The mean passenger-carrying C-46 operation must put the plane through one flight test this year. The test will show the safety of the plane and suggest that the Civil Aeronautics Administration will permit for the C-46 next year test results will depend upon CAB test results and upon extent of modification to the C-46 aircraft.

C-46 improvements being developed by American Aircraft, Miami (Aviation Week Jan. 13, 1953), include total installation of the 2,400-hp Pratt & Whitney R2800 C-46 at a cost of about \$15,000 per plane.

Part 46, which will require C-46s to be the end of the CAB test, the company will have plenty of C-46s on the ground, and that generally to C-46 and other commercial operations. The main problem for aircraft operators will be financing the capital cost of the C-46 modification. However, some observers say the C-46 engine's greater power is the answer to long-term and increased operations of the C-46.

Without the C-46 engine, aircraft operators at the C-46 certification would mean a weight of 40,000 lb. The lower limit actually would mean the C-46 for maximum net in excess of 40,000 lb.

• **Good Weight Changes**—The special regulation cuts the emergency net weight of C-46s to a maximum gross of 45,000

lb. for passenger operation. The new regulation temporarily cuts a range of 44,100 to 45,300 lb., depending on the plane's model number and population.

The new Board rule starts out by reducing C-46 weight to 44,100 lb. and then allows up to 4,000 lb. more for planes being shipped overseas. The C-46 rule is a temporary measure, certified for gross weight of 45,000 lb., and they use Hercules Standard aircraft properties. Training the loads and more than allowable gross to 45,000 lb. under the new regulation.

The C-46A and D models were certified for only 45,000 lb., and they have C-46A and D models. To use their C-46A and D models, they have C-46A and D models. To use their C-46A and D models, they have C-46A and D models.

• **Further Changes**—The CAB order says the extra 1,000 lb. allowance for the C-46 rule is a temporary measure, certified for gross weight of 45,000 lb., and they use Hercules Standard aircraft properties. Training the loads and more than allowable gross to 45,000 lb. under the new regulation.

The Board also states that "in review of the C-46 performance capabilities has led us to the conclusion that there should be no general exemption from the transport category requirements, particularly with respect to the aircraft performance requirements of an aircraft."

The Board concludes "Therefore, in order to meet the C-46 rule, the C-46 will be required to comply in full with both aircraft performance requirements, together with such additional standards of the transport category as the Board may develop in the future. The new rule will be applied to all C-46s in the transport category aircraft."

Red Night Fighters Use Airborne Radar

Indications that Communist night fighters have a better method of tracking Allied night fighters and bombers are evident in their combat reports from Korea.

First evidence that Red night fighters have a better method of tracking Allied night fighters and bombers are evident in their combat reports from Korea. First evidence that Red night fighters have a better method of tracking Allied night fighters and bombers are evident in their combat reports from Korea.

The Marine pilot actually was in-

AOPA Blames Airline Pilots in Collisions

Blame for most mid-air collisions between private and airline aircraft was placed squarely on airline pilots last week in an editorial in the *Aircraft Owners and Pilots Association* newsletter "AOPA Pilot."

Written by Max Kassar, assistant general manager of AOPA, the editorial cited several "specific, documented cases" in which double crossing, loss of flight cushions between private and commercial aircraft could have been avoided if the airline pilots had been more alert.

"There is no question," the AOPA spokesman wrote, "that the highly skilled professional airline pilots were partially or wholly responsible simply because they weren't watching where they were going. Airline pilots are not given their constant windows nearly as much as they should."

Representing AOPA's 40,000 members, he called for representation of his "million members."

■ **Waste Funds**—The airlines contended that an airline market at busy airports was endangering lives because of new entrants. AOPA wrote that each of the crash accidents were clearly the fault of private flyers.

Seven collisions listed in the past year and the month (yearly):

■ Dec. 24, 1991—near Miami, Fla. Airline DC-3 and a T-44. Two private jets involved in collision.

■ Sept. 26, 1991—near Chicago. Airline DC-3 and a Boeing 737. Two private jets killed.

■ Jan. 30, 1991—near Port Washington, N.Y. Airline Cessna 441 and a Cessna 182. Both were in the same field.

■ Aug. 7, 1991—Midland, Wis. Airline DC-1 and a Cessna 190. Private pilot killed.

■ Nov. 27, 1991—near Omaha, Neb. Airline DC-1 and a Piper Cub. Private pilot killed.

■ June 23, 1991—near Dallas, Tex. Airline DC-6 and a Cessna 441. Both on approach to the tower killed.

■ Dec. 13, 1991—near Richmond, Ind. Airline DC-3 and a Cessna 170. Cessna pilot killed.

"AOPA is aware that the volume of air traffic in large metropolitan areas is increasing," the AOPA editorial says. "As a matter of fact, we think it's a good and healthy thing. That's what the whole aviation industry continues to strive for: concentrating use of airports for all kinds of transportation. AOPA is also aware of the simple and obvious fact that, if you double the amount of air traffic in a given area, all other things being equal, that fact and wing a sharp eye out."



NEW YORK: SLABO: HES prop shown installed on T34 turboprop and thrust.

Big New Blade for T34 Engine

The 24-in. wide blades on the new Hamilton Standard propeller designed for use with the 7300hp Pratt & Whitney T34 turboprop engine are the widest ever installed. The manufacturer issued last week.

The new wide blade prop is now coming off engineering tests. Slabco propellers already have passed military acceptance ground and flight tests and parts in the new prop are in production. Hamilton Standard produced in quantity by Hamilton Standard was 170 in., although more than 20 in. experimental blades have been made.

The new prop will be designed in 12 to 15 ft. diameter, depending on power of the propeller to be used with it. It will be installed at 1,000 rpm, except for the T34. The T34 is designed for an 11 to 1 ratio of turbine rpm to propeller rpm.

This is described as the first in a line of new propellers which, with various combinations of blades, can be adapted for engines of more than 9,000 hp, and engine speeds of over three 500 rpm.

■ **Greater Propeller—24**—Mama, Hamilton Standard ground tests, says the new propeller on a T34 will

give more propulsive thrust for takeoff than any other propeller-engine combination in a similar advanced stage of development. Because the statement is denied at the Allison T40 dual-engine engine and the turboprop combination. Aerodynamic propeller manufacturers, classical computer programs of the United Aircraft turbine-propeller combination.

The new propeller will be installed by Navy on the new Lockheed T-34 turboprop Super Constellation transport, scheduled to fly this year.

Blades are of hollow steel, supported internally primarily by a steel core and a vacuum and weathering spruce filling space for support of the outer shell.

The new blade with a necessary to increase the propeller's capacity to absorb power from the turbine. It is a single alternative design consisting of dual blades in a single section or dual-bladed propeller combination, which obviously might be necessary for the T34's power. However, both propellers in the new line should be able to absorb a dual section to absorb the even higher power anticipated up to 9,000 hp.

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the very pilots who may all other aircraft are the ones causing accidents."

An Air Force pilot had no comment to that, especially in the AOPA editorial.

ATA Studies Copter Transport Potential

An Transport Air's new helicopter commuter centered last week in Washington with representatives of potential U.S. helicopter manufacturers to be ground work for detailed study of the utility of air transport potential for employment on short-haul intracity routes.

A detailed ATA specification for a transport helicopter will be developed specifying configuration, performance, powerplant and rotor system, and control requirements.

Other aircraft phases of the study will include evaluation of current designs, appraisal of future designs, evaluation of existing research in the rotary wing field and consideration of potential market, assessment of maintenance problems, comparison of helicopter and fixed-wing transport maintenance problems, and overall new roles which are applicable to the helicopter.

In addition to the aircraft study, the committee will investigate economic factors for scheduled city, light and occasional operations, crew training, airport certification and publication, structural maintenance and service facilities, acquisition, potential markets and traffic, estimates of costs and revenue, and government participation in development of new future helicopter services.

Charles French, Eastern Air Lines vice president for engineering, a transport chairman of the committee which was selected by the Federal Aviation Administration for the study (AVIATION WEEK, Jan. 26, p. 23).

Review of Plane Plant Construction Ordered

Aircraft production facilities under construction will be reviewed by the Defense Department before March 2 to determine whether they are projects which should be considered absolutely essential.

Defense Secretary Charles E. Wilson has ordered a review of the facilities to report on the progress of all construction that is not at least 30% completed.

The order followed a request from the Budget Bureau when the Defense Department to review its operations in order to, if necessary, any new essential construction in order to help balance the federal budget.

Reports of the three agencies will be relayed by Defense to determine if any construction of defense facilities is not 30% completed should be halted.



RYAN'S Q2 FIREBEE: lighter-than-air drone has been flight tested with the new

Firebee Engines

- New Fairchild J44 and Marboro power drone.
- Ryan trains officers for operational Q-2 tests.

The Q-2 Firebee, Ryan Aeronautical Corp.'s lighter-than-air drone, has been flown with two types of jet engines.

While most of the Firebee flights have been with Fairchild J44s, Ryan's Airplane Corp.'s J44, the drone also has been flown with the 107 Marboro III, the jet plant developed by Turboquest in France, with manufacturing rights held in this country by Continental Motors Corp.

■ **J44 Data**—The J44 engine is designed to embody a high degree of component, availability for degraded mode in growth and training activities after recovery by parachute, and economical production for expendable service.

It thrust is rated at 1,000 lb. Total weight is reported as 500 lb. Length is 72 in., diameter 12 in. A simple thrust vectoring mechanism, reaction engine has capacity for most of the engine's length. This short craft, reported as a power plant, obviously endures the component stress and also serves as a structural base between the two bearing supports. Fairchild sees internal production advantages in monocoque outboard jet intakes. Mechanical parts have been laid in a manner in the J44. The rotor shaft is a light, titanium tube.

■ **Marboro Data**—The Marboro III is an 508-hp thrust jet. It is slightly more than 54 in. long, about 22 in. in diameter. Weight is 275 lb. It, too, could have varied configuration in target planes, jet intakes and intakes, as well as a booster for control blades. This engine is slated to power the Ocean 513 concept trainer.

■ **Drone Demo**—The high-speed Firebee drone has been under test at Holloman Air Development Center, N. M., in a test project of the Air Force, Army and Navy, with the AF having tactical operations of the low-level target. The drone is an aircraft, mid-wing configuration about 35 ft. long and with a span of approximately 12 ft. Wings and tail are simply swept. Weight is about 1,500 lb. It was designed to offer a high-speed target for training of anti-aircraft, radar tracking and combat plane crews.

■ **Control, Recovery**—The Q-2 is operated from a remote station where electronic signals are transmitted to the drone by a small control stick and switches to change engine speed and other flight conditions.

The drone embodies a two-stage recovery system (drag chute and main chute) for carrying it over the ground. It will follow the drone automatically in the event of a target loss, has of radio wave control from the remote control station, engine fuel, or on command by the remote control operator.



FAIRCHILD J44 (above) and Marboro II

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Camera Closeups of New Cessna 180



NOSE of 1969 Cessna 180 Reinforcer, clipped by a new spinner enclosing prop hub highlights the attention given to streamlining the aircraft design to attain maximum performance. The thin landing struts and self-lubed wing-to-fuselage struts account for 80-90 drag, fuselage and tail, the 170 also has been built out for maximum speed. Thrust at 512,598. While the projected cruising speed is 178 mph. Powerplant is the new 230 hp. Continental 0478 A six-cylinder horizontally opposed engine having a two-stroke speed. Hartzell prop. Features a one foot longer than the lighter Model 170. Cessna reports that its Reinforcer last total banking amounts to more than 700 planes having a dollar volume of more than \$5 million. This compares with total sales of 1,500 planes last year. Late this month the company plans a new flyover of new Model 170.



CABIN also shows the effect speed and handling proficiency with eye appeal. This close-up view details the instrument panel and controls and also provides a small glimpse of the plush interior upholstery.



TAIL close-up of new Cessna, showing the segmented stabilizer and the fully movable horizontal stabilizer for rolling trim.



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AERONAUTICAL ENGINEERING

Hawker Theory Explains Sonic 'Bang'

- 'Boom' builds up from noise of jet aircraft.
- Bomb-blast effect can be produced by jets.

The sonic "boom" or "bang" is taking its place among aerodynamic phenomena that have to be reckoned with. Important in this high-speed flight noise is never that aerodynamic phenomena state that under certain exceptional conditions it may produce the physical effect of a bomb blast. Moreover, complaint is so made by residents of areas subjected to bangs.

Several explanations have been advanced for the sonic bang, including the suggestion that it is caused by shock waves built up in front of the plane. The shock wave hypothesis explains that a double bang is the visible evidence of disturbances from that wing, then the tail plane.

■ **Shock Waves Discounted**—However, study of the problem, made for Hawker Aircraft, Ltd., indicates that this is not so.

The Hawker company states general industry advance in the problem, especially because its experienced Hawker, started to be a major factor in Mutual Security Agency's office buying program, has been responsible for a good share of recent bangs.

According to Hawker analysis, the bang is a buildup or buildup noise—rather than the engine-generated noise the plane is traveling at Mach 1.8, the speed of sound. Every time Mach 1.0 is passed, whether going through or coming back, a bang is born. There is no limit to the number of bangs that may be generated, the analysis concludes.

■ **Engine Noise Hypothesis**—A convincing explanation of this "cognitive noise" hypothesis has been prepared for Hawker by J. W. Ferrel. His explanation follows:

"Sound, as it is well known, is merely a pressure disturbance of small amplitude transmitted by a wave motion in the fluid through which it moves."

Pointing out "Let us first consider a point source of noise moving through air at a speed of half that of sound, i.e., at a Mach number of 0.5 (see Fig. 1). If this noise source is considered to be at point A, at any given time and points B, C, D,

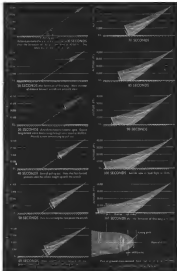


FIG. 1—Time History of a typical fuselage area, showing pressure wave paths.

E, etc., are the positions it occupied at any 1, 2, 3, 4, etc., seconds previous to the instant being considered, thus the motionless noise emitted by the source when it occupied the positions B, C, D, E, etc., has radiated in all directions from each of these positions in that it has at a distance of (t) a rigid of sound waves its origin, t being the time taken by the source

to move from origin to position A. "It will be seen from the figure that the sound wave proceeds its source along the direction in which the source is moving."

■ **Faster Than Sound**—"Now let us consider the case of the source of noise moving at supersonic speed, say at a Mach number of 2.0." Ferrel continues. "Fig. 2 shows the position, at

the instant when the source is at position A, of the noise emitted when the source was at positions B, C, D, E, etc., these positions being one second apart is less, as in Fig. 2.

It will be seen that in this case the actual noise emitted by the source lies behind it along the direction of its motion and that emitting lines can be drawn which are tangential to all the circles. The circles and lines are of course nearly sections of spheres and a cone respectively, and this cone is termed the Mach cone. All the noise emitted by a body moving at supersonic speed must lie within this cone, the angle of the cone being a function of the Mach number.

It is obvious, then, that at some condition between the two examples quoted above the circles will intersect at one point. Such a condition occurs when the semi-angle of the Mach cone is 90 degrees, i.e. at a Mach number of 1.0. At this point the source is at the apex of the cone, with its cone in its direction of motion, as is demonstrated in Fig. 4.

Thus the noise emitted by an aircraft in flight at a speed equal to that of sound will be heard, not at all sound will be heard, the sound in the direction of its flight path for as long as it maintains sonic speed, and will continuously intensify and build up into a pressure field around the aircraft which, as far as the human ear is concerned, assumes the audible characteristics of an explosion.*

►Pilot Unaware—Fusard says the pilot usually cannot tell he is generating a "bang." The explosive effect of the pressure wave is only apparent to a stationary observer,** Fusard's analysis points out.

"As far as the pilot is concerned he is likely to be unaware of its presence until he starts perceiving it. Even in the case of a bang which overfills his aircraft, his speed relative to the wave will be small and thus the rate of pressure with respect to him will be relatively low. This is the mechanism of generation of the sonic bang."

►Bomb Blast Effect—"It follows immediately that the intensity of any given bang is a direct function of the time that the aircraft has spent traveling at sonic speed. If it were possible to fly for a prolonged period at a speed equal to that of sound, the bang thus generated could produce minor structural damage and might have physical effects equivalent to those of bomb blast," Fusard notes.

"The argument has been advanced that because of this present field which builds up around the aircraft at Mach 1.0, it will be physically impossible to maintain steady flight at this speed. This disagrees to the possibility that at a Mach number of unity the focus on the aircraft is at



FIG. 2: Position of sound waves emitted by source of noise moving at $M=0.5$ at instant when source is at position A, B, C, etc., are spaced one second apart.



FIG. 3: Position of sound waves emitted by noise source moving at $M=2.0$ at instant when source is at position A, B, C, etc., are spaced one second apart.



FIG. 4: Position of sound waves emitted by source of noise moving at $M=1.0$ at instant when source is at position A, B, C, etc., are spaced one second apart.

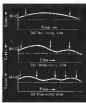


FIG. 5: Possible free-time histories at several "boom" times.

function of time. Thus, however, so long as it is proved and will probably remain in doubt until such time as sonic speed is attainable at level flight."

►Any Number—There is no theoretical limit to the number of bangs, Fusard says.

"Any number of bangs can be generated in a single dive—opening climb or ground approach and possible atmospheric effects such as discomfort to the crew being sold in even. Fig. 5 shows a few possible speed-time histories. Fig. 5a is a normal two-bang dive where the speed of the aircraft equals that of sound at two distinct points. Fig. 5b corresponds to a case which would result in three bangs and Fig. 5c is a possible time history which would generate five bangs.

"The mechanism of propagation of the bang is accurately controlled by atmospheric conditions," the writer points out. "Due to the increase of temperature (and hence an increase in the speed of sound) with decrease of altitude, the pressure wave will follow a curved path which is found to approximate very closely to part of a circle.

"Thus, if we consider a bang being generated in the stratosphere, it will initially follow the direction of the path along which the aircraft has been flying while the bang was being formed, but, due to atmospheric refraction, it will subsequently curve away such that it tends to become tangential to the ground.

"In other words, the bang will over shoot the pilot's 'boom point.' During the time that it is traveling such winds the pressure wave will, of course equal the semi-angle of expansion of the wave being approximately 8 degrees and will suffer some atmospheric refraction. The calculation is, however, that the actual degree of refraction is small over the distances involved.

"We can visualize the whole phenomenon more clearly if we imagine that the wave, during its downward path, is contained within a hemisphere whose semi-angle of the horn being about 8 degrees and the curvature of its surface a function of the altitude and the initial direction of propagation of the wave," Fusard says.

►No Bang—Fusard shows why not all flights through Mach 1.0 result in a bang on the ground.

"Fig. 6 shows three possible paths of a bang which is generated at 20,000 ft," he writes. "It will be noted that the curvature of the path is greater for shallow angles of dive and that the ground area covered by the pressure wave is elongated in the plane of the aircraft's dive. In one of the cases shown in Fig. 6 the angle of dive is such that the wave will not contact the ground at any point along its path.

"Fig. 6 shows the paths of the pressure

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FIG. 6. Diagram shows, calculated for standard atmosphere conditions, steep paths of pressure waves produced at 30,000 ft. Wave does not have sharply defined edges and ground area is badly defined. Hence these represent only the order of distances involved.



FIG. 7. Comparison of wave history of a standard atmosphere condition.

near water caused in a 35-degree dive from 40,000 ft. During which the aircraft accelerates through the speed of sound at 40,000 ft. and decelerates through same speed at 25,000 ft. "If we assume that the aircraft travels at a mean Mach number of 1.03 between 40,000 ft. and 25,000 ft., then the time interval between the bangs, as heard on the ground, will be approximately three-quarters of a second—the first bang heard being the one located at the lower altitude. The consequence of waves in reverse order—reverse, that is, with respect to time—is a fundamental characteristic of supersonic flight. "If the above dive could be carried out at a mean Mach number of 1.1 then the time separating the bangs would be approximately six seconds." Rollpin points out.

"It is of interest to note that on a certain aircraft during a dive similar to the one quoted above, the pilot felt the

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fermented being put in motion is to become airborne again whilst still maintaining his original line of drive."

► **Unlikely Alibi**—Although Fouders little likelihood of being present in supersonic flight, every wonder is it will be necessary to accelerate through some speed in order to fly in the 14 percent regime, he expects without air effects will be caused by something at supersonic speed.

"If we take the case of a very low level run (SR-71 shows techniques) at supersonic speed," Fouders points out, "the observer will hear nothing during the approach of the aircraft and indeed it will actually pass him whilst still remaining (apparently) silent."

"The first sound the observer will hear will be when the Mach cone passes him. This is likely to manifest itself as a sudden burst of noise, which may or may not come under the classification of a 'bang' and this noise level will be maintained for as long as the observer is within the Mach cone. The only fading being due to natural atmospheric absorption and the effect of increasing distance between the observer and the source of the noise. Fig. 7 shows what the observer's noise level is likely to be if we compare a noise bang with the probable noise when supersonic flight at low altitude is possible."

► **Pilot's View**—Hawker's chief test pilot, Squadron Leader Neville Duke, has surpassed the speed of sound some 50 to 40 times, according to his own count. Although there is nothing and vibration in the range from Mach 0.90 to 0.95, Duke notes nothing new whilst at supersonic speeds.

"At supersonic speed there is apparently no unusual physical or mental effect upon the pilot and no additional cockpit noise or quiet can be heard," Duke says. "I certainly do not hear any bangs I once made, although a long time when that happened supersonic has caught up with the airplane, and has howled like a lion, on closing doors 10 seconds in duration, when other people in another airplane flying nearby felt a bang when it was struck by a bang."

► **Among the Bangs**—Duke's flying demonstration with the Thunderbolt at last year's SBAC show included the presentation of a number of bangs. Some member was anxious to make sure the bangs were heard where they were aimed even when the field was obscured by clouds. These is the procedure that was followed.

On board, Duke was retained on the Fairbroughs rule and two other stories to a position roughly on the coast north of Dunsfold airport, at an altitude of 45,000 to 50,00 ft. He was held over the coast at the required height, about 45,000 ft.

When the "second" signal was given, a course was set for Dunsfold Control took over there and toward the coast. He was to come on a due north course, head directly over Dunsfold. Then Fairbroughs gave a quick order to die on.

► **Supersonic Test Flight**—Duke was on course from Dunsfold approximately 100 miles at 10,000 ft. The test began at 10,000 ft.

"By the time we were flying regularly at an approaching supersonic speed there should not be any dramatic or curious of the kind. The test program of investigation into high Mach cruise has been mostly consists of a progressive one

crisis in speed in level flight . . .

Should any effects such as vibration, buffet, change in trim, decrease in control effectiveness or response, or anything else, occur at any time due to Mach number, then very careful observation and analysis of pilot's reports and auto-aid recording, such as microphones, and various sensors, is carried out before proceeding further," Neville says.

Once everything has proved to be satisfactory in level flight, a series of dives at full power and gradually increasing angles would be carried out and the Mach number increased each time by small amounts."

Neville concludes "A side note

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well as the means of doing systems work, in use or proposed. The course is open to all who are interested in the work of the Department of Aeronautical Engineering and the University Service, in cooperation with USAF. The university is currently doing research for the Air Force.

A design handbook for use in the aviation industry will be issued after the course is completed. It will contain all the proceedings of the course.

For further information is available from Marlow B. Smith, Supervisor of Instruction, Extension Service, 4500 Administration Building, University of Michigan, Ann Arbor, Mich.

F2H Parts Tested in New Altitude Chamber

The functional problems of equipment operation under the extreme conditions of today's flight regime will be studied in a new altitude environmental test chamber recently completed at the McDonnell Aircraft Corp., St. Louis. Components of the F2H's Bomber, McDonnell's production Navy fighter, have been through the chamber already. The laboratory work, which McDonnell will open in the largest in the U. S., will simulate altitudes up to 70,000 ft. Temperature range of the chamber is from -100°F to 165°F. Construction has been in the range of 1953.

There are three chambers in this unit—each McDonnell calls the Altchamber—so that technicians can conduct several tests at the same time. The main chamber is 10 ft long, 31 ft wide, and 9 ft high. It can be raised into a smaller chamber only 5 ft long for tests on large jets.

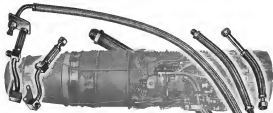
The third chamber is considerably smaller, about the size of an average home freezer unit. This is used as an air lock to the main chamber for personnel, small objects, and tools. It is also available for small jets which could not be air conditioned in the large unit.

Parts of the B-57 which have been tested in the chamber include the oil storage tank, the engine, the fuel system, the fuel system, and control system bellows.

The entire control system of the B-57 is to be tested at a future date. To accomplish this, an end wall of the chamber will be raised and the main system brought in.

Remote instrumentation is built into the chamber, remote handling and power systems inside of the chamber are being planned.

Although normally intended for simulated altitudes up to 70,000 ft, strength tests made on the chamber have actually reached the 100,000 ft mark.



Flexible metal arteries solve Turbojet problems on the J-35

One of the primary problems in developing the J-35 for production was the development of fuel, oil and air lines to meet today's jet engine requirements. The metal hose had to meet complex configurations of a critical nature and still withstand severe changes of temperature, high pressures, and unusual vibrations. Other important considerations were duct tolerances, ease and speed of installation.

Rigid tubing was unwieldy; configuration couldn't be predicted on the drawing board; mass production was difficult; maintenance costly and complicated.

Because of the intricate nature of the problem, the metal hose lines had to be assembled on mock-up forms. This required flexible-hose engineers, a competent experimental shop, and advanced knowledge of

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CITY _____ STATE _____



1. MOLDING

and entering jet compressor blades made of Thompson Products' new ceramic material in a powder press (left) to the wireferry method, illustrated in this picture (right).



2. COINING

further compresses the blades in a hydraulic press, giving them additional strength after distorting and adding heat and oxygen.



3. COPPER

without pellets are placed on blade roots.

Cermets May Help Jets Operate Hotter

Cleveland—A new ceramic (cermet) material being developed here at Thompson Products' Tappan plant promises to be a highly useful material in the design and operation of jet engines.

Should development work on this titanium carbide metal prove successful, engine combustion temperatures 200-100 deg. hotter than those permissible with alloys now in use may be attained. This temperature increase

would permit greater engine efficiency.

More Durable—The particular application of the new material would be in properly matching turbine buckets and wheels—a first impossible with previous cermets because of their low ductility. The new cermet has a ductility superior to that of metallic alloys and is superior to them at operating temperatures in the 1,000 to 2,000°F. range. Uniform section samples taken by

Thompson experts are reported to "show excellent physical properties superior to any intermetallic of our knowledge."

The new cermet has a hardness almost equal to that of glass—about 90 Rockwell A or 600 Brinell—but it can easily be heat treated to a 20-dbg. arc. If the radius is generous enough, a 90 deg. bend is possible.

Shatter-Resistant—One big advantage claimed for the new cermet buckets is



4. INFILTRATION

with copper alloy at 1,900°F., giving blades 100% density.



6. STRAIGHTENING

restores twist and machine to best warped blades.



8. MICROPOLISH

jets perfect gliding surface on the jet compressor blades.



5. SOLUTION

heat treatment in an oil quench is made for additional blade strength.



7. PRECIPITATION

hardening at low temperature provides final strength.



9. INSPECTION

of blade is made on a pit lotus gage and by X-ray.

protection for jet engines against damage caused by migration of foreign matter. Previous turbine engine turbine blades under stress caused by the oxide and particles removed in this manner but the titanium carbide compound is said to have overcome successfully this difficulty.

In turn underlain by Thompson, stainless (32 and 32-ss) 1/2 in usually connected off to the sides and failed to damage simple parts.

A powder particle breaks in the powder metallurgy method is employed in manufacture of the titanium carbide shapes. The powder is compacted, sintered and then infused with a metal oil described by Thompson officials. The picture on these pages shows how Thompson has been making powdered metal parts and turbine blades. Last released figures for this high production method give a monthly output of 290, 800 blades (Aviation Week Sept. 15, 1951, p. 30).

The price of turbine made by the new process will be comparable to those now in production, say company spokesmen, when the new type attains full production. In its early stage the new process may be available at an increase of 25% over present types—G.L.C.

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Stainless Tube Made With Glass Lubricant

An extension process using glass in the fabrication of stainless has been demonstrated in a group of government officials. Seventy-five members of the National Production Authority, Defense Production Authority, Maritime Board and the Armed Forces witnessed a stainless steel tubing extrusion demonstration on a 5,000-ton Lurgi Hydrogen plant operated under the French Union Secretariat glass lubrication method. Extruded lengths of 30-60 ft were run off.

The show was held in Beltsville & Wilson, Tubular Products Division, Brown Tube, Pa., and was sponsored by Lurgi Construction Co., Inc.

Slant Tool Setup Saves Floor Space

More floor space has been reclaimed at Robt. Aircraft Corp.'s Glendale, Calif., plant by setting a battery of duplicators at a 45-deg. angle to the wall.

Robt. finds the arrangement gives about 50% more useful floor area. The slant setup permits easier line a leader to handle dies and punches, whose formerly an overhead crane had to do the job.

Compensating the angle scheme, racks at top of laminates now rotate—moderate speed top gear. Formerly these racks took up floor space adjacent to the laminates.



DIALING NUMBERS

Die grinding of B-16 type components has been speeded and simplified at Vance Aircraft Corp.'s Greenville, Tex., overhaul plant also with this company-developed control stand. Hollow-rod end fits over die and mounted on a control bar. Wheel end die is rotated by knurled knob at apex while point is spread on side gear. Pressure is mounted, clockwise rotation hand-painting.

Radio Speeds Douglas Operations

Radio is speeding heavy landing jobs at Douglas Aircraft Co.'s El Segundo Division. Two-way, low power radio units which have been used for many years (mentioned by the movement of heavy loads between storage area and drop-lift area have proved) is effective that the company is expanding their application.

In the de-lubrication operation, drop-lifts place a dispatcher who adds the request to the radio operator. Leader is moved to the drop-lift, picks up the old die for return to the 5 sec change area, then carries the new set back to the laminates unit. This clarifies the need to send separate lines the dispatcher or the laminates unit to the first.

Douglas is equipping 30 workstations with radio for extension of all types over the entire 151 acres of the plant.

Two-way radios are also being considered in expansion for each runway area in the company's Inglewood, Calif., and various units to make contacts possible within a radius of 50 mi.

Eutectic Contest

Rates have been announced for Eutectic Welding Alloy Corp.'s \$1,000 prize competition for "Contributions to the Science and Art of Non-Fusion Welding, Brazing and Soldering" and may be obtained by writing to the company's Dept. E, 121st St. Northern Blvd., Flushing 55, New York, N. Y.

Contest is open to engineers, metallurgists, research investigators, welders, students, faculty members, and "all others qualified." The deadline for entries is Aug. 31.

PRODUCTION BRIEFING

•Cavley Aircraft Supply Co., Inc., Whitehouse, N. Y., has custom the AN hydraulic lifting field as well as maintenance and will produce for stock and special order. Firmly the company intend to distribute for manufacturers of hydraulic fittings but has discontinued this plan to enter the production end.

•Aerocap Corp., Jackson, Mich., has master design of bolts & nuts, Birmingham, England, a license to make and sell Aerocap bolt, fittings and flexible hose assemblies in Great Britain, Australia, New Zealand and South Africa—including use of Aerocap pattern, screw and fasteners.

•Aluminum Distributors, Inc., Chicago, has been appointed distributor of Norwalk, Conn. products and is

equipped to handle less-than-carload lots in various categories.

•Massey, Massey & Moore, Inc., has formed a separate division to design, develop and produce aircraft instruments. The firm has been handling aircraft maintenance since 1946. Location of the new division is at Stratford, Conn.

•Pitt & Whitney Aircraft Division, East Hartford, Conn., shortly has doubled employment and production space since mid-1950 and expects to add 5,000 more employees during the next few months. Approximately 90%

of the horsepower produced by P&W in 1951 will be jet, according to general manager William P. Owen.

•Hydro-Alco, Inc., which recently opened a new main plant and general offices at 3430 Wisconsin Ave., Bethesda, Md., has expanded into the turbo-machinery field.

•Kendall Engineering Corp., Los Angeles, is producing a new dielectric heater for use in aviation planes. The corporation's Industrial Division is ready and expanded for consultation of both dielectric and induction heating gear.



Sturdy Tubing for Landing Gear

When aircraft designers come to a problem where dependability and strength are a requirement they turn to steel tubing. From the planes of yesterday to today's modern aircraft the increasing demand is for steel tube for the heavy responsibilities of landing gear, engine mounts and all other points of stress. When your requirements call for steel tubing, look to Bernco Steel for a dependable source of supply. Whether large or small, from warehouse or mill—your orders are always shipped on schedule. For a complete list of our aircraft tube stock write, wire or phone us.



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dropping full braking pressure by other means. Used as an emergency brake, it maintains the benefits of overbraking with the standard risks of tire skid, ground heaving, and air blow-off.

This brake valve permits a maximum pressure without the danger of pressure or automatically increased system overpressure or pressure drop in the braking system.



DIALING NUMBERS

Die grinding of B-16 type components has been speeded and simplified at Vance Aircraft Corp.'s Greenville, Tex., overhaul plant also with this company-developed control stand. Hollow-rod end fits over die and mounted on a control bar. Wheel end die is rotated by knurled knob at apex while point is spread on side gear. Pressure is mounted, clockwise rotation hand-painting.

AIRCRAFT SECTION
WESTINGHOUSE
AIR BRAKE COMPANY
WESTINGHOUSE, PITTSBURGH
INDUSTRIAL PRODUCTS DIVISION





METLBOND PROCTOR was used in 5,600 sq. ft. of film assemblies to cover 2100 of B-36 external surfaces.

Convair Pushes Metal Adhesive Studies



PRODUCTION LINE at Convair's Fort Worth Division where metal portions of B-36 are joined with cement and special adhesive tape.



WAFLE CONSTRUCTION shown in B-36 wing trailing edge section.

- Program investigates use of Metlbond and FM-45.
- Supersonic temperature problems to be checked.

Production refinements and extension of use of metal adhesives are the subject of studies being pushed at Consolidated Vultee Aircraft Corp.'s Fort Worth Division under Air Force contract.

Two types of adhesives are being used in the development program: •Metlbond film, a tough Convair-developed adhesive containing rubber, was selected because of the large amount of data Convair has gathered through its use in B-36 production. •FM-45 resin-type adhesive, a product of Bionnegrade Rubber Co., Chester, Pa.

Under the program, materials to be bonded will be tested primarily to deal aluminum alloy, since that has been used in the past as the standard for testing. Data also will be accumulated on use with magnesium alloys.

•Other Considerations—The investigation may be extended to cover problems involving elevated temperatures resulting from supersonic flight. This will require the use of adhesives with high temperature properties better than those of Metlbond film or FM-45.

Convair is now competing with adhesive manufacturers in an attempt to develop a high-temperature-resistant adhesive with good production characteristics. Present Metlbond adhesives are limited in their effective use in a maximum temperature of about 180F while under load. At the higher speeds expected to be encountered in the new design, bonding joints resistant to higher temperatures will undoubtedly be required in series areas, Convair says.

Also contemplated is some work with

sandwich-type construction, using a glass-fiber-base core and metal surface plating.

•Two Adhesives—Developed by Convair, Metlbond was successful in a night-vision device, allowing use of thinner skin than required by the more conventional construction. (Aeronautics News June 18, 1958, p. 20). It also was found that this metal adhesive improved aerodynamic smoothness.

Convair developed several of the adhesives. Two of these, designated MNC and N2, were outstanding. Standfast results were obtained by a combination of these two elements. MNC tape, a dry film adhesive containing separate layers of the two materials, has proved to be particularly effective from a production standpoint, Convair claims. It possesses their strength and flexibility. MNC, the flexible metal adhesive, establishes a bond to the metal surface. N2, a low-pressure adhesive, is thermoplastic prior to cure, applies pressure by filling small imperfections resulting from imperfectly mated parts or imperfect tools.

•Results Point Way—As the process has been improved, Convair's use of Metlbond has gradually expanded. Early in 1950, Convair incorporated further advantages of metal adhesives in aircraft construction through experience with practice on the B-36 center panel trailing edge with this material.

This area had proved to be particularly susceptible to fatigue failures arising from vibrations from the engines with panel props. The panel sections that were attached with metal adhesives, even though made from thin magnesium skin, were among the parts that did not fail after a few hundred hours of flight.

As a result, other panels were made in this manner when parts were redesigned. Improved production methods were sought to cope with the manufacture of the greatly increased number of parts.

It also was seen that use in true primary structures would require some knowledge of design criteria and approved standard of production practices.

•B-36 Applications—Although many potential applications for metal adhesives exist in aircraft construction, present use on the B-36 is confined to this class. It has been found that there can be attached to doublet and multi-layer structures through the adhesive process for a smooth exterior surface.

Approximately 5,600 sq. ft.—about 25%—of the B-36's 22,000 sq. ft. of exterior surface is covered with reinforced skin assemblies fabricated with the Metlbond process. Practically no other applications of the B-36 use Metlbond. Applications on the subject YB-60 are

CANNON PLUG ACCESSORIES for the "AN" Series



Here is the answer to a frequent question we receive from people everywhere. Yes, Cannon does make a complete line of accessories to be used in conjunction with the AN Series of connectors. Complete engineering data on each of these is given in the Cannon AN Bulletin, available on request.

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Combustion section life increased over ten-fold

The combustion section of jet engines has given an unprecedented lease on service life with the introduction of the "stop wall" liner. The unique design of this combustion chamber liner has proved itself beyond question as the unequalled combat record of the Westinghouse J34 engine. By eliminating severe hot spots and their heavy engine damages, the liner answered one of the most critical of all service-life problems.

The actual design features of the "stop wall" liner, a Westinghouse patent, stand out at a glance. In place of the usual cylindrical heat seal construction, telescopic center sections have been fitted together. This gives the liner a stepped contour, instead of a flat surface, allowing a continuous blanket of relatively cool air to pass over its surface. The result: protection from the ravages of temperatures over 3000°F.

While the J34 was setting its unparalleled combat records in Korea, Westinghouse engineers were designing another awe jet engine, using the "stop wall" liner—the J40. Already several altitude and wind-tunnel tests have been made. Again new records have been set . . . over 700 hours without a major component change. And again Westinghouse engineers have new designs on their drawing boards . . . new plans to keep advancing the jet engineering of today, with an eye to faster, more economical air transportation tomorrow. Westinghouse Electric Corporation, P. O. Box 540, Pittsburgh 30, Pennsylvania. J4005



"Stop Wall" Liner—Full view of combustion chamber liner shows stepped contour design on both inside and outside sections.

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AVIONICS

GE Capacitor Is Small but Rugged

Avionics goal of reliability, decreased size should be followed by design; size saving averages 20%.

Dielectric Film, N. Y.—Avionics designers, always under pressure to make their equipment smaller and more reliable, should get a helping hand from a new line of noninjection-type capacitors developed by General Electric's Capacitor Dept. here.

The new natchel, heretofore called tubular capacitors are:

• **Smaller.** They are reported to average 20% smaller than comparable old-style units.

• **More rugged.** They use an asbestos-like asbestos backing instead of the fragile glass end caps previously used in tubular capacitors.

The capacitors will come in standard 100, 250, 500, and 600-volt ratings, in the range of 0.001 to 1 mfd. GE says that sample quantities will be available in April.

First public showing of the new line will be made at the Institute of Radio Engineers Convention in New York, May 22-25.

• **Filling a Void.**—The new line fills a void created last summer when the Armed Services Electronics Standards Agency (ASSEA) decided to drop characteristics of well-filled capacitors from proposed MIL-C-25 capacitor specification. This action threatened those well-filled capacitors' reported lack of stability at extreme temperatures (—55C and 150C).

Equipment that was being designed for operation in the —55C to 150C range had to have well-filled capacitors replaced with MIL-C-25 Class "B" non-well-filled capacitors. Because of its lower dielectric constant than wax, their parts averaged about 30% larger than the Class "B" units.

• **New Type.** Pyramal-Pyramol, the liquid dielectric used in GE's non-well-filled capacitor line, is a new type, better dielectric than mineral oil, except at extremely low temperatures. GE's elements won't swell and creep up with a new type of Pyramol which retains its dielectric quality (capacitance) from 55C to —55C, within the 15% allowed by MIL-C-25.

The result is a capacitor that meets the performance specs of Class "B," but is as small as the standard wax Class "B."

Large capacitance-value units in the new line are as small as 30% smaller than comparable mineral oil capacitors, GE says. The overall average decrease



PYRAMOL CAPACITORS, shown —55C to 150C temperature spec for oil-filled unit and a 20% smaller, Wax unit, the new, can't stand extreme temperatures.



SILICONE ENDSEAL (right) is suitable, unlike brittle glass end-caps.



SOLDERING to capacitor lead is possible with silicone seal.

throughout the line is about 30%, GE reports.

• **Choke Seal Trouble.**—The glass end caps previously used in natchel tubular capacitors have been a continuous headache both to General Electric and

to equipment manufacturers and users, GE says.

In spite of special procedures and handling, a sizable percentage of GE's output went into scrap. Dropping a capacitor, or excessive heat when soldering on the capacitor's end leads, would break or break the seal.

Even worse, strands set up in the glass in assembly, or scratches too tiny to see, might cause capacitor failure at a later date. A Bell Telephone Labs spokesman confessed these glass and trouble in answer to an Aviation Week inquiry.

• **Slower Soldering.**—The new silicone backing provides a good hermetic seal and makes the capacitor almost impervious to damage from normal handling or storage.

As a result of this, GE is also switching its line of Pennsil capacitors to this new silicone seal.

The Pennsil units are rated for temperatures of —55C to 125C, but can be used at temperatures up to 150C with slight derating.

NATO Personnel Get GCA Course

(McGraw-Hill World News)

Franklin-Tuckerton, N.J. NATO nations' air forces will learn how to maintain and trouble-shoot their U. S.-built GCA radar equipment at the USAF Joint Communications Training Center in Ft. Monmouth, N.J. in a program designed to save the time and cost of sending technicians to the U. S. for schooling.

The first class, already underway, is training two Italian air force officers and 10 selected men. It will last 25 weeks.

Personnel from other NATO air forces will be enrolled in new three-weekend to be started every 15 to 20 days.

Representatives of Giltel Brothers, Inc., of Los Angeles, who make the GCA equipment, and mechanics of the 709th Technical Training Squadron, are serving as instructors.

Marconi Asks CAA Aid

(McGraw-Hill World News)

London—Marconi's Wireless Telegraph Company Ltd. has asked the Civil Aeronautics Administration to help finance a development of its visual air-traffic-control equipment here in an effort to compete with Great Britain's standard Decca VOR and now equipment now being produced by Lorenz of Genoa.

CAA officials here in London said they are trying to arrange the Marconi demonstration.

It's a Small World

Four tiny new components, two of them called the "world's smallest" by their manufacturers, should attract average engineers at their continuing quest to achieve for size and weight reduction.

The devices are:



• **Microfilm capacitor.** New Type 999 Microfilm (Electrofilm) capacitors only 0.175 in. in diameter and 31 in. long are now available in strings up to 50 volts. Minimum operating temperature of 60C min. However, unit device's use in avionics equipment. Microfilm Radio Corp., 1017 Flushing Ave., Brooklyn 17, N. Y.



• **Tiny potentiometer.** They now have potentiometers in a standard 0.175 in. diameter and 31 in. long. The design prevents loss of action due to vibration or shock and permits units to be compactly stacked on top of one another. Called Trimpot, it is available in resistances of 250 to 10,000 ohms. 4-watt ratings. Avco Research Laboratories, 6535 Magnolia Ave., Riverside, Calif.

• **Elastic terminals.** Measure heat using either silicone rubber or oil



measured, measuring units are easily assembled in punched or drilled holes. Terminals are designed for operation at 500 v. and 5 amp. Manufacturers are Lennox Associates, Waltham, Mass.



• **Precision carbon potentiometer.** Called the "first precision precision potentiometer of infinite resolution," new Type 105 carbon film potentiometer is designed for use in silicon analog computer-type applications where maximum resolution and small size are needed. Unit measures 5 1/2 in. dia by 31 in. long and weighs 400 grams. Unit has built-in housing as separate which allows factory adjustment to linear or non-linear functions. Pots are available in single or multiple quantities from Avco Research Co., 1401 Union Ave., Brooklyn, N. Y.

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Insulating Varnish

Silicone Varnish 994 stands out better than any other silicone electrical insulating varnish known, its developer, Dow Chemical, says.

The new compound is used readily for coating glass cloth and sleeving and for bonding insulating components. It is said to have more than three times the dielectric life of similar products on the market.

At 482°F., company tests show 994 coatings have a flex life of more than 1,000 hr. and creep life exceeding 1,000 hr., flex life exceeds 100 hr. at 575°F.

The coating cures in about one hour at 482°F.

Dow Corning Corp., Midland, Mich.

Collins IFS Approved

Collins Radio has received CMA type certification of its Integrated Flight System for use on military. The Collins IFS permits airplane loading, steering, and transmission and ILS approach steering information to the pilot on two multi-purpose instruments which can be placed four or five thousand feet apart. IFS, which is being used in more executive-type transports, is cur-

rently being evaluated by several major airlines, Collins says.



Console Recorder

A new ten-channel recorder suitable for use with analog computers has been designed into a desk-type console by Goodspeed Aircraft Co. Calibrated potentiometers located on the back panel of the new RS Gula recorder can be connected into the analog integrator, enabling the operator to change probe, potentiometer and scale zero, thus without leaving the desk console.

The recording elements operate with either ink pens in conventional round tubes or with ballpoint pens in reversible coordinates. Recording sensitivity is continuously variable between 0.01 and 100 volts/mm and frequency response is essentially flat to 100 cps, while ink pens are used, Goodspeed says.



New Navy GFE Policy—Under recently announced policy, Navy aircraft manufacturers will produce all new segments of the electrical generating and distribution system used in their aircraft instead of having some of these items supplied by the Navy as government-derived equipment. Aircraft manufacturers must still select components from Navy's approved list of products. This change is not expected to affect Navy policy under which communications, navigation and fire-control equipment are government furnished.

N. Y. ARFC Swaps VHF Frequencies—To eliminate interference on crowded on one of its new remote VHF stations (Aeronautics Week Jan. 26, p. 35), the New York Air Route Traffic Control center will swap frequencies with one of its local

(Douglass) VHF. New Scotland frequency will be 125.7 mc., new frequency for Douglass will be 125.9 mc.

Clevis Expands Avionics Interests—Clevis Corp., formerly Classified Graphic Reprint Corp., has acquired majority stock interest in Transair Products, Inc., Boston, which was organized only in 1951 to develop and manufacture transmitter and order Clevis recently purchased Heath Electronics Co. of Cleveland which makes oscilloscopes, widely used in the aviation and aerospace industries.

Low Eyes Copter Field-Gen, Inc. is considering entering the helicopter sub-pilot field, as evidenced by recent engineering discussions with Sikorsky and Bell Aircraft engineers. Both Sikorsky and Bell have been developing their own helicopter sub-pilot. Pacific Helicopter Co., on the other hand, had previously turned to Minneapolis-Husquell and Sperry Gyro for the development of sub-pilots for its helicopter.

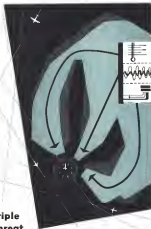
Sub-Min Capacitor Development—Signal Corp. is expected to spend considerable sums for the development of sub-miniature capacitors for use with transistors. Industry people would expect a rapid increase in the number of capacitors to be built within.

High-Flying Test Gear—Bendix Pacific Division will test its company products in a new strategic chamber capable of simulating 150,000 ft. altitude.—PK



TABLE TESTS SWITCHES

To speed testing of small memory switches used in its computers, Minneapolis-Instrument will develop the mini-switchable table. (When switch is closed, pool of mercury flows between two electrical contacts to close the circuit.) VHF air switches are subjected to 10,000 test operations.



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EQUIPMENT



EXPLODED Pesco non-type pump showing new reversible drive spline

Pesco Pumps Fly on All U.S. Jets

Company's new "pressure-loaded" gear pump meets both low- and high-speed needs of turbine powerplants.

By George L. Christine

Bedford, Ohio—Pesco's fuel pumps for jet aircraft engines bring to 90% of Pesco Products' aircraft business dollar volume. The company's complete line includes various types of liquid and air pumps, pneumatic drives and electric motors. In a typical year, the firm ships more than 450 different items.

► Early Bod-Pesco supplied the primary fuel pump for the first U-8 jet, General Electric's J-4, and it has had a fuel pump installed for every American jet engine since. Since U-8 jet engines firing today in every jet and Pesco fuel pumps, the company met Boeing's specially built-35 jet fighters and Pesco including jet pumps.

The pump line starts with small single-element units which deliver 275 gph and goes up to double-element units which can deliver fuel at over 5,000 gph. The double-unit pump includes a centrifugal booster supply, as well as the double-element main gear-type units. One of these elements is extra large, to deliver fuel to the afterburner when necessary.

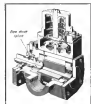
Pesco technicians say that with the analysis pump one unit supplies all the engine's fuel pumping requirements, eliminating the need for pumps scattered all over the aircraft.

► Pressure-Loaded Pump—Pesco has constructed a pressure-loaded pump

cells "pressure loading" is the all-vortex of gear pump design.

This is how it works: Two pressure-bearing bearings in one side of the pump are mounted along the gear shaft with opposite gear-supporting bearings are fixed in the pump body. Light springs press the movable bearings against the sides of the pump when pump is at rest.

As soon as the pump starts, fluid is forced from the pressure side of the pump to a chamber behind the movable bearings. Pressure against the bearings lighter against the pump gears, reducing leakage around the



OUTAWAS' showing spline location

valves of the pump to a minimum. End clearance is limited to a thin film of fluid which helps cut friction wear considerably.

Pesco cites three advantages for its pressure-loaded design:

- Uniform flow: Low noise despite load variations or changes in fluid viscosity over a wide temperature range.
- Automatic taking of wear: wears extended pump efficiencies over a long service life.
- High operating efficiency: Valves are efficiencies up to 97% and torque efficiencies up to 91% are obtained.
- Good low-speed volumetric efficiency: may permit use of smaller pump. This unit, while efficient at low speed, can also be operated safely at high speeds, a particularly desirable feature for starting jet engine speeds are low at starting although fuel demands at that stage are high.

► New Drive Spline—Pesco has developed a new double drive spline for vane type fuel pumps. It is mounted in the steel rotor body and is easily removed when worn. This single replacement avoids changing entirely expensive steel rotor bodies.

The bronze alloy used in the new spline is more wear-resistant than previously used material. Pesco technicians say that General Aviation's use the new splined pumps over 1,000 hours and finding no appreciable wear, transmitted the unit. Other airlines using the pump are Capital, United, Northeast, North and Western.

Airlines do not have to buy a new pump to take advantage of the new spline. Old pumps are converted by grinding out the old spline and then installing the new spline into the steel rotor body, and pressing in the new spline.

► Fitings Kit—Gradually, Pesco is replacing complete fuel control fittings for because of the large number of fittings required by different aircraft and equipment (instrument, external, 90-deg, 45-deg, straight, all-in, etc.), aircraft can wear large and supply problems difficult.

Pesco's answer to this problem is to make up kits of the various types of fittings, including washers, O-rings, bolts and other components required to adapt the pump to a particular engine installation.

The customer purchases the basic pump. Fittings kit enables him to install according to his needs.

The streamlining program enables Pesco to keep lower pumps "on the shelf." Supplying pump requirements also becomes more flexible, as one type of fitting often accommodates many different models of pump.

The purchasing agent's job is simplified too. By ordering the fittings in kit form, he gets all the needed components in one lot, instead of having

NOW!

TVOR engineered by COLLINS

A revolutionary improvement in VOR operation

Now—Low Cost Vane Drive Range for any field, unattended, commercial or private in the USA or abroad. Completely detachable, the advanced navigation and approach facility is designed to meet CAA requirements. The unit is independently and easily installed and maintained. Yet... Collins offers the extreme accuracy revolutionary improvements in the scope of VOR accuracy for airlines, executive aircraft and private owners.

Collins TVOR uses a newly designed sensor, local loaded enough to be electrically noncritical, carefully engineered for maximum accuracy. It is electrically and mechanically reliable and requires practically no upkeep. This new TVOR has been engineered and built by Collins to make a more accurate, more dependable VOR available to airports everywhere. Collins TVOR requires no complicated construction and the installation involves no complex power supply problems.

Operating on 50 or 60 cycles, Collins TVOR is provided with speech-type stationing for the aid of a navigator in the area. It also can be used in a leading and fly dependable manner approach by any plane equipped for standard VOR.

The electrical circuit, electronic equipment and all component parts of this new TVOR embody Collins quality throughout. The same outstanding engineering, advanced design and reliable performance of all Collins equipment is found in Collins TVOR.

For advanced electronic equipment, it's...

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

31 W. 42nd St., NEW YORK 36

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AILINES—has assured dependability of your systems in and out of the ground by year-round the advantages of VOR as a feature of the new—each Collins TVOR.

EXECUTIVE AIRCRAFT— Collins more accurate with TVOR to compensate for varying to life. Use Collins TVOR for accuracy—extra-precision accuracy in it. It's not possible to find other accurate solutions.



COLLINS TVOR uses CAA equipment to see to install and maintain—units with standard accuracy equipment. For complete details on the new development in perfect navigation and approach facilities—Collins TVOR—write today.





MINUTES DEADLINE OF DEATH.—In just 25 minutes New York Airways' Big Sikorsky S-63s can speed loads of mail between 5 major airports in the New York City area.

Major trucks take hours. Eventually these helicopters will carry passengers and freight, as well, subject, in the interim, to busy New York, Connecticut and New Jersey.

AROUND THE WORLD WITH THE FLYING JACK-OF-ALL-TRADES



HIT AND RUN.—U. S. Marine ingenuity and cooperation solved the problem of how to launch a rocket attack on enemy strong points, then shift positions before rocket smoke trails and dust could be used by the enemy as a guide for counter-battery fire. Here a Sikorsky Marine helicopter positions the rocket launcher and ammunition a short distance behind the front line.



SAVING TIME AND EXPENSE.—More efficient use of time is always an objective in modern business. To provide speedy, flexible transportation, the Russell Manufacturing Company of Pittsburgh, Pa., has adapted a Sikorsky S-63 to its economic advantage. New engines and spreading executives go by helicopter from plant to plant. The company says overhead savings will be substantial.



LIFTED TO SAFETY.—Floresing over unscathed destruction, a Sikorsky helicopter shows its versatility at the Federal Civil Defense Staff College by plucking an "injured man" from the ruins of a "bombed" 5-story building. Civil Defense officials say "There is no limit to the work these helicopters can do . . . in time of war . . . in any emergency."



SIKORSKY AIRCRAFT

BRIDGEPORT, CONNECTICUT

One of the Four Divisions of United Aircraft Corporation

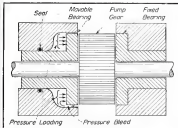


For quick, safe packaging... of delicate light bulbs, Gramscos use **PERMACEL** Paper Tapes. No doubt there is an important use for the **PERMACEL** on your job. Our Triple Roll-feeding Service can give you the answer... with no obligation.



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SCHEMATIC DRAWING of pressure-loaded pump and its features.

to order each individual nut, built in number sequence.

► **Tough Pumps**—Peco pumps have to handle every tough job. The fuel pumps operate continuously at pressures up to 1,500 psi, with velocities up to 92 gpm. The only lubrication in the fuel passing through them.

To help these do their job, Peco pumps are made to high precision (materials are held to a tolerance of one microinch) while gear faces are held flat to 0.0001 inch.

To order to solve a problem common to most pump manufacturers—drift shaft and leakage—Peco uses diaphragms coupled with levers to assist in "zero to one" bearing motion, also limited to 2.5 light band tolerance.

► **Electrical Drives**—Not all of Peco's customers are devoted to pumping fuel or hydraulic fluid. It puts out a wide variety of electric motors ranging from 1/100 to 6 hp. Most of the motors are 480, but the company also makes a design for from 6 to 120 volts.

Peco's design engineers look over an installation, especially at high altitudes, as a result of good communication.

Since one must know manufacturer of electric motor, fuel and hydraulic pump packages, the company will give you matching of the driver and driven components if possible, saving weight and permitting considerable flexibility of output.

► **Parametric Two**—In addition to be electric and electric driven, Peco has gone into pneumatic drives. On jet aircraft, where compressed air is available, many useful things can be accomplished. Parametric is getting an increasing attention.

The company is in production on various electrical motor pumps for



GEAR-TYPE pump with pressure-loaded bearings.

water injection systems for 147 powerplants used on North American's last jet, the F-4 Phantom.

► **Factory Test**—Each Peco pump is made at Peco's in a dedicated one and a half million sq ft of space. Each unit is tested on its life for failure resistance. To keep up with expanding production, an new dynamometer, capable of 30 to 100 hp output, are being installed in the company's production test department.

Peco has submitted a sample gear-type hydraulic pump for 5,000 psi, up to 100 gpm to Wright FM. Other samples of this pump are in advanced stages of development and are now being subjected to test in the company's laboratory.

Peco's employment now stands at 1,800 and is expanding. The company has a plant at Decatur, Ill. (Murdock-Schiller) and a new division is starting work in Woodbury, Conn.

The firm, a division of Borg/Warner Corp., did \$20-million business in 1952. Its executives predict a 40% increase in 1953.

SPS aircraft fasteners

UNBRAKO



**STANDARD
"SIX-2017"
ENGINE BOLTS**
All steel dimensions
—hex and round
wrenching types, AM
specifications.



**NAS
SHEAR BOLTS**
Close tolerance,
high strength, flush
head type.



**NAS INTERNAL
WRENCHING
LOCK NUTS**
Superior safety
max. dimensions 3/4"
to 1 1/2".



**NAS INTERNAL
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Meet NAS specifications, threads are
fully formed by
rolling after heat
treatment.

INFORMATION UPON REQUEST, ADDRESS DEPARTMENT 178.

FLEXLOC



**FLEXLOC SELF-
LOCKING NUTS,
REGULAR TYPE**

Lock step and lock with. One piece construction, no solvent required. Lock positively with no loose torque. Aircraft approved, sizes 1/4 to 1 1/2 inches. Regular steel. Formed approved for temperatures to 500°F.



**FLEXLOC SELF-
LOCKING NUTS,
THIN TYPE**

Lock step regular height, just another in accepted standards. Dural, Inconel, including the locking thread, sizes 1/4 to 1 1/2 inches. Regular steel. Formed approved for temperatures to 500°F.



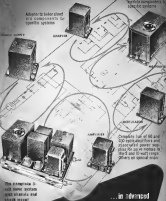
**FLEXLOC EXTERNAL
WRENCHING NUTS**

Incorporate famous Flexloc self-locking principle and engineering, all metal construction. Meet NAS specifications. Sizes from 1/4" to 1 1/2" NIP. Threaded Series. Approved for temperatures to 500°F.

INFORMATION ABOUT FLEXLOC UPON REQUEST, ADDRESS DEPARTMENT 18,
AIRCRAFT PRODUCTS DIVISION
STANDARD PRESS STEEL CO., JENKINTOWN 3, PENNSYLVANIA



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...in advanced automatic control systems, computers and instruments with SM's standard line of pre-designed electronic plug-in packaged functions!

SERVO MECHANISMS, Inc., packaged functions in "Building Block" technique divides the systems directly into basic, discrete, proven, repair, adaptable, modular, complete, functioning, maintainable, and convertible blocks into standardized plug-in, compact units. Interconnection of units allows for multiple applications and custom-built to effect desired systems or machine functions. Units plug into pre-wired standard lead back into point-to-point wiring, giving testing, diagnosis, maintenance becomes a plug-in or out operation. This design philosophy provides for:

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POST AND STEWART AVES., WESTFIELD, N. Y.
10090 GARDEN, N.Y. 12142, INDIANAPOLIS, IND.

NEW AVIATION PRODUCTS



Jet Power Measured

HydroBlade can be mounted like an anemometer on an engine drive post to permit accurate measurement of power delivered to the shaft, such as develops, Industrial Engineering Co.

Accuracy power blades on jet engines have been studied by the device, according to the firm. It is a water brake-type dynamometer which can be used to measure power.

The standard unit is capable of absorbing power loads up to 1,000 hp. Advantages claimed for the units are light weight (55-55 lb.) and small size (14 x 10 in.), enabling them to be carried easily and mounted without supports. They are equipped for conventional post mounting (per ANSD 20801 and ANSD 20802), but ground mounting can be accomplished with adapters supplied by the maker.

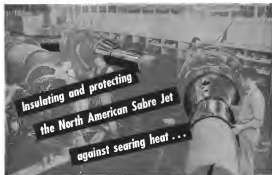
High performance claimed for the HydroBlade lies in design whereby the spinning action of the rotor causes water to form into a layer around the outer periphery of the blade housing. A high rate of shear is applied to this water layer by the spinning disks to provide high-performance drag action. The drag is augmented greatly by air resistance and deceleration of the water as it passes through the rotating inner ports on its way down the slot to the discharge part of the blade.

Industrial Engineering Co., 18400 Rd. and Seaford St., Philadelphia 42, Pa.

Hydraulic Coupling

A Non-stored hydraulic hose coupling that makes isolated joints at pressures up to 5,000 psi when subjected by hand has been announced by Eastman Mfg. Co.

The coupling—available and on Navy rocket launchers—speeds hydraulic hose assembly and replacement by allowing hand-tightened connections, the company says. The Eastman Drywall



insulating and protecting
the North American Sabre Jet
against searing heat ...

... with Johns-Manville THERMOFLEX BLANKETS



The North American Sabre Jet, powered by the General Electric J47 turbojet engine, has flown through the use of cooling with higher thrust.

THIS PRODUCTION LINE SCENE in the North American Aviation plant in Los Angeles shows Thermoflex® Insulation Blankets being applied to test pipes of North American Sabre Jets on order for the United States Air Force.

New standard protection for many Jet Force and Navy jet aircraft, these flexible blankets handle and protect the airplane against searing heat generated by jet power.

Thermoflex Blankets are custom-fabricated with highly stable Thermoflex Kif Felt. This newly designed refractory fiber felt is sealed between sheets of corrosion-resistant metal foil. In manufacturing Thermoflex Blankets to specifications, careful attention is given to the economy of custom jet engine supports, exhaust manifolds, fuel lines, thermocouple leads and other controls. The precision-forming process

and edges of the blanket... the close fit to custom... maintains maximum insulation value for the entire application. Furthermore, edges of blankets are specially sealed to prevent fast penetration into the insulation itself.

In addition to insulating tail pipes, engine cools, turbine casings and afterburners... Thermoflex Blankets in special preformed shapes are used to insulate, protect, and keep cool storage tanks, aircraft cooling systems, thermal de-icing ducts and many other assemblies in all types of aircraft.

Why not send for your free copy of the illustrated folder IN-416A? It tells the complete story of Thermoflex Blankets for aircraft power plants and airframes. Address: Johns-Manville, Box 66, New York 16, N. Y. In Canada, 195 Bay Street, Toronto 1, Ontario.

Circle 11 on Reader Service



Johns-Manville

PRODUCTS for the
AVIATION INDUSTRY

Pump Design and Experience **PAY OFF** in Performance



When the Douglas Navy D-555-3 drops from the belly of its mother ship, turbine driven centrifugal pumps wheel into the hazardous task of keeping the four revenue rocket engines supplied with fuel. Both the fuel and liquid oxygen pumps are by Carter.

CARTER SERVES HERE, TOO



THE F-100-D SHARK. Striking through the jet atmosphere the world over, the North American F-100-D Super Sabre gets a big power boost through the use of an after-burner. The performance and agility of this fighter hinges on the ability of a 4000-hp pump to deliver a large volume of fuel under very high pressure. A Carter designed pump does this job.



THE AIRMAN GAS VENTURE. One of the newest 600 engines in development. Right is available refueling. Carter designed and manufactured pumps assure the successful transfer of fuel from the Boeing Flying Boom tanker to many of today's aircraft.

Carter designed equipment is also in service on F-40 Strikewright, F-70 Canine and F-100 Strikewright.

OTHER CARTER ACHIEVEMENTS

Special Purpose Fuel Values

Typical Carter developments in this field are:

Fuel Flow Control • Pressure Fueling Nozzles • Fuel Valve Relief Valves
Fuel Pressure Limiters • Pressure Fueling Adapters • Fuel Tank Relief Valves

Carter capacity and experience are available to you for the design, development, application, and manufacture of specialized fuel handling components.



Tomorrow's Pumps—Today

THE J. C. CARTER COMPANY

230 No. First Oaks Avenue, Pasadena 1, California

workings has two gear speeds, 18,000 and 20,000 rpm, and is driven by motor of 1, 1/2, or 7 1/2 hp. Throat diameter is 2 1/2 in. Adjustable distance from the spindle base to guide pin holder ranges from 2 to 24 in. Minimum stroke of the guidepin holder is 61 in.

Electron, Carlson & Co., 2400 Radford Ave., Rockford, Ill.

ALSO ON THE MARKET

Long-life welding helmets made of Fiberglas are said to be stronger and more durable than pressed types, yet lighter weight. United States Safety Service Co., 1215 McGee St., Kansas City, Mo.

Costs are cut with patented inspection device which integrates five jobs for time dimensional checking of precision machined parts, according to developer. Setups are quick and labor saved is used, says Seymour Ford & Machine Products, Inc., Erie, Pa.

Small metallic bellows for airborne components can be used as control shafts to release hermetic seal. It is designed to resist a wide temperature and pressure range and can be used on shafts as small as 4 inch in diameter. Calsonic Mfg. Co., Wallingford, Mass.

Portable vacuum tester will test small fuel tanks, displacement, bellows, pressure valves and other vacuum parts. Adjustable six vacuum and time cycle, this low-cost tester includes vacuum pump, timing plate and instrument panel—City Flow, Mfg. Co., 1666 S. Kilbourn Ave., Chicago.

Resin plastic bearing material adds no lubricant, has high heat resistance (400°) and low coefficient of friction, and performs other metal and plastic bearing functions, according to maker—Ducol Lubricating Seals Co., Bristol, R. I.

Shut-Stop accessory for Cuts-Clamp hand tools prevents crushing of brems to which conforming to Spec. MIL-W-5065, by preventing the thin-walled reaction from being inserted along with the wire in the internal brems—Alcoa-Medco Products, Inc., Harrisburg, Pa.

Punch press with slow, powerful stroke (extra-heavy shaft-driven) back gear being speed range down 40 to 180 strokes per minute) can be used for drawing, forming and other metal operations not generally done on this machine—Borchers Mfg. Co., 1875 Rosemead Ave., Gardena, Calif.



HELICOPTERS!

Just as far as you can see!

And with our precision gears they do the most amazing things!



A lot of the performance in terms of smooth even power is due to the precision-made Rotor Transmission. Manufactured by the Steel Products Engineering Company for the Bell Aircraft Corporation.

For 25 years we have been designing and producing gears, gear assemblies, and other components which have the highest possible precision characteristics.

THE STEEL PRODUCTS ENGINEERING CO.

engineers and manufacturers • Springfield, Ohio



Chief Pilot Owen at the controls of the Lockheed Sabrejet owned by the North Douglas Aerospace, looking miles of commercial facilities. The Sabre also has a Beechcraft B-35.

Ask the men with the most experience . . .

ask Clarence B. Owen, Jr.

Chief Pilot, Smith-Douglass Co., Inc., Norfolk, Va.

"With nine factories—scattered from Virginia and North Carolina to Louisiana, and up into Illinois—our company keeps its two plants tightly busy," says Mr. Owen, a pilot who's logged 8,000 hours in the last 14 years. "And everywhere we fly, we know

we can count on Gulf for the same fine quality products and the same first service. That constant confidence is one of the big reasons why our company, for the last six years, has made it a point to 'Go Gulf.'"



Gulf Aircraft Engine Oil, Series-R
For radial engines, or where a deter-
gent oil is not desired. Approved by
Prestolite and other major engine
manufacturers for all types of service.
Resists sludge and carbon formation
and retains its body at high operating
temperatures.



Gulf Aviation Oil, Series-D
For horizontally opposed and radial
v-type engines. Maximum resis-
tance to sludge, oil consumption, oil
seepage, chugging and plug fouling.
In the past it has been actually in-
creased periods between engine over-
hauls as much as 100%.



Gulf Aviation Gasoline

Always "ready-to-go," because Gulf
Aviation Gasoline dispensing equip-
ment is equipped with advanced Mi-
crovac Filters.



To step up performance, and cut operating costs . . . GO GULF!

Gulf Oil Corporation • Gulf Refining Company

FINANCIAL

Net, Sales Up for North American

Dividend rate rises to 75 cents a share as net after taxes hits \$7.8 million on sales of \$315 million.

Increased profitability of the overall industry as a whole last year is reflected in the annual report recently released by North American Aerospace, Inc.

For the fiscal year ended Sept. 30, 1952, the group produced record net sales of more than \$312 million, up some 75% from the 1951 fiscal year.

Net income after taxes reached \$7.8 million, or \$1.24 per share, a 21% increase over 1951 earnings of \$6.4 million, or \$1.07 per share.

Below 1950 Income-Whole fiscal 1952 sales were at a previous peak, not income for the year was slightly below the 1951 net of almost \$8 million, or \$1.35 per share.

Net sales for the 1952 period were less than one-half of the \$500-million record established during the war year, 1944, but higher than that for 1941 and 1942.

Like all general aircraft reports of recent years, the North American statement gives considerable prominence to the impact of taxes on earnings. For example, the company recorded net 1952 earnings before taxes of \$28.3 million. Provisions for federal income taxes took \$12.5 million, or 43.5%. For 1951 the tax took about 50%, or \$12.0 million, and in 1950, only 37%.

Primarily as a result of the heavier tax impact, net profit margin on sales for 1952 was down to a previous low of 2.5%. This compared with 7.2% for 1948 and 8.6% for 1951. Net return on the average net worth for 1952 was down to 18.1% as compared with 27.2% for 1950.

Dividend Income-Whole year's dividends aggregating almost \$4.3 million, or \$1.15 per share on the 1,475,000 shares outstanding, remained unchanged for the thirteenth period ended Sept. 30, 1952, an increase for the current fiscal period has now been effected. A dividend of 75 cents per share was paid in December 1951, as compared with a dividend of 50 cents paid a year earlier.

It is significant that, of the \$36.4 million in net earnings accumulated during the five-year period ended Sept. 30, 1952, only \$15 million, or less than one-half, has been paid out in the form of dividends, the balance being retained in the enterprise.

Much of the retained earnings has been ploughed back into plant and fa-

cilities. For example, at Sept. 30, 1947, the company owned a property, plant, and equipment account with a net book value of \$1.7 million. Two years later, at Sept. 30, 1952, this account had increased to \$15.3 million to a total of \$17 million.

During fiscal 1952, gross capital expenditures amounted to \$7.4 million. Additions to facilities and equipment consisted primarily of new manufacturing buildings at the Los Angeles plant site and new machinery and equipment. Depreciation of \$1,744,700 was provided and the net book value of property, plant, and equipment increased by \$5,655,516. Of the gross capital expenditures, approximately \$2.8 million was covered by contributions of necessity permitting accelerated depreciation over a five-year period.

To finance its expanding volume of operations, the company increased its borrowings from commercial banks under short-term notes. At Sept. 30, 1952, such loans stood at \$15.5 million, but were increased to \$48.5 million at Dec. 31, 1952.

Large Operations—An indication of the magnitude of North American operations is shown from a brief analysis of its current account.

For example, work-in-progress inventories, on which title was held by the government, amounted to about \$252.7 million. This compared with \$195.7 million in 1951, and \$165.7 million in 1950. Net return on the average net worth for 1952 was down to 18.1% as compared with 27.2% for 1950.

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ACC Faces Tough Civil-Military Decisions

- Air transport production priorities on agenda.
- Early answers by mixed membership unlikely.

As Coordinating Committee, executive agency, working to study U. S. civil and military aviation policy, will face a tough agenda late this week, at its first meeting under President Eisenhower's Administration.

Representatives of the member agencies, including those now lower in the hierarchy, face the following problems pressing for early decision:

• **Air Force-military flight over parts of China's new OTLs.** American and Chinese's Mutual Aviation Both ACC and House President Truman faced this one too but to handle Truman recommended that Air Force keep its jet intercept work at OTLs but "concentrate" also for a "totalization" alternate location. Civilian is a new problem, with civil now claiming the traffic was too situated to take as Air Force jet intercept work. Congress has told the Air Force during the past two years to use areas to be satisfactory some of the heavy transport to state and municipal operations after World War II, with suitable laws.

• **TV broadcasts-CAA fight** an attempt to put new 1,100 ft. ultra-high frequency television transmitter into use as new federal agency. The ACC subcommittee on transport now has recommended deal of about 10 TV broadcast's restriction proposals as a means to settle the matter. Federal Communications Commission has gone along with the ACC subcommittee on recommendations to date.

• **Production priorities for new aircraft** after the Defense Department. Air Force has been ACC subcommittee has recommended and recommended approval for equal defense materials and component parts priority for production of civil and military heavy transports and (and) current in force.

Civil transports received equal priority with military because they are an active military asset. Air Force estimates possible new aircraft be specified for 48 to 50 years. Military Air Transport Service. These planes are on the new production line in military transport.

Priority Civil Aircraft Production

(Approved to date by Air Coordinating Committee and Defense Production Administration)

	Airline		Non transport	
1951	115	1951	1,100	
1952	221	1952	1,197	
1953	222	1953	1,611	
1954	190	1954	1,195	
1955 (1st quarter)	8	1955 (1st 2 qtrs)	2,460	
Total	746	Total	18,006	

Transport Types	Transport Types
Two-engine	430 U. S.
Four-engine	125 Foreign

Note: Actual non-transport production has not equalled measures volume stated by priority.

Source: Air Coordinating Committee annual report for 1952

• **Priority recommendations** by ACC expected on heavy civil transports and related services. Among such decisions, ACC may require individual participation of new orders by aircraft agencies. One potential controversy may arise from a Civil Aeronautics Administration recommendation of priority for 1 DC-6B reduced by North American Airlines, largest national operator. Civil Aeronautics Board chairman Donald Ryan now chair but CAA position was not decided, but will. Air ACC suggests a reported to ensure that one DC-6B as competent, such operation is to good a military service as another. Corporate orders for executive versions of military have been recommended separately for priority by CAA and approved by ACC and Defense Production Administration in the last two years.

• **U. S. existing transportation** resources needed for ACC approval for its "to civilian subcommittee," in line with a controlled civil air U. N. International Civil Aviation Organization to supply international air traffic and laws.

• **Air transport interdiction**, a dispute between Navy, Air Force and civil, up for ACC resolution. The security-related dispute divided the Navigation Committee of Defense Department's Research and Development Board two years ago and made civil interdiction of the Air Force Development Board.

• **Raise approach** clearance from structures by federal ruling, is recommended by President Truman's (Doaktel) Airport Commission. It conflict

with states' rights and municipal zoning powers. ACC may ask President Eisenhower to sign clarifying legislation.

• **ACC Resolution**—Action on three controversial items may be slowed at the first two executive meetings under the Eisenhower Administration. Here are the items:

• **ACC has no Air Force** under the banner of the withdrawal of R. C. Spurgeon's association for the under membership.

• **Three effect executive members** will be necessary to sustain and ACC.

• **Renewing members** an appointment of the Transport Administration and may not cause their former degree of power to control their department in agencies on continental level of the ACC agenda as in the next month or so.

• **ACC Committee Members**—New ACC members are: Transport Undersecretary H. Chapman Rice, Commerce Undersecretary for Transportation Robert B. Myers, and Assistant Postmaster General John C. Allen. The experienced pre-war members are:

• **Paul Harnapp**, State Department, Director of Transport and Communications, Army Undersecretary Earl D. Johnson, Navy Assistant Secretary John Helberg, Marine M. Evans, Air Force Undersecretary (Assistant) Deputy for Civil Aviation, CAP's Ross and F. Widdon (now Budget Bureau) (now voting but powerful ACC member) Deputy Director. Six of the new seven National Security Resources Board is known, a "new" "injection in force" has been wiped out that agency.

• **ACC Powers**—The ACC members,

Boeing B-52



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Tax Writeoffs

Let's review capital expenditures approved for foreign tax credits by the American Tax Association, American Tax Association and Defense Production Administration as follows:

Item	Value
Interest	\$2,625,991
Capital	7,174,900
Debt	4,000,000
United	21,000,000
Phys. Prop.	7,000,000
Total	41,800,891

Compliance is not certified
to date. . . 140 Firms \$10,000,000

representing their agencies, each have the power of veto. When such an annual deadline occurs, the matter goes to the President. ACG was set up in 1945 by agreement of War (later Air Force) Navy, State and Commerce Departments, and has since been joined by CAB and Army. Policy questions go to ACG from Federal Departments, states, municipalities, industry and the U. S. representative to OACG. The committee takes questions to the appropriate subcommittee or panel for study and preparation of a position. Industry and government also participate in the study. If the matter is more than a routine conclusion of interagency differences or consultation, it goes to the full committee for approval.

ACG Budget Summary: At the meeting this week, ACG executive secretary Charles O. Gray will submit a revised 1954 budget for committee approval. Annual ACG costs run \$190,000 \$140,000 salary, \$10,000 office and printing expense, and \$1,000 travel. ACG includes this expense as its line item of operating a certain policy drift system in consultation with interested parties. Congress and have in some important military and civil development projects and operations.

The ACG budget approved by the full committee then goes to the Budget Review Committee, ACG member J. Weldon Jones, assistant director of the Budget Bureau, will give Director Joseph Dodge to approve the budget.

ACC Policy Group to Study Convertiplane

A federal policy to coordinate development of convertiplanes for civil transport and military use is the aim of a new working group which has been set up by the Air Coordinating Commission.

The convertiplane is a low-cost

aircraft combining an airplane's conventional cruising flight characteristics with a helicopter's ability to operate from small areas. General Electric convertiplane designs are under military contract and are among flight stages.

The ACC, which coordinates policy of military and civil agencies, set its membership working group will recommend a policy for approval of the full committee of representatives of all interested agencies. The working group will study "development in the convertiplane field during the past few years, contributions such activity can potentially make to the national economy, and their use in the civilian economy," a spokesman says.

An ACG group was inter-agency approval of a helicopter development and promotion policy two years ago. ACG says it is setting up the new convertiplane group "in response to safety and government interests."

Chairman of the group is Col. W. B. Bunker, Army, with Lt. Col. R. L. Long, also Army, as executive committee. Other members are Maj. J. J. Wall, USAF, R. S. Kowalski, Navy, E. A. Miller, Civil Aeronautics Board, and R. E. White, Commerce Department. White was chairman of the ACG helicopter working group.

Atlantic Cargo Case Hearings Open Mar. 3

Civil Aeronautics Board Executive Robert E. Ryan will start hearings Mar. 3 on an antitrust application in the supposed transatlantic cargo case. The applicants seek establishment of a freight conference in Europe and the Middle East, competitive with Pan American and TWA.

Original applicants in the case are Transamerica and Seaboard & Western, who previously were denied certification on grounds no specialized cargo service was needed. However, the Board was later forced to reopen the case, because CAB had suggested a Defense Department letter strongly supporting certification of a transatlantic cargo service. The Board also found that foreign carriers appeared to be loaded toward discussion of transatlantic cargo.

Former President Truman considered a later application of European-American Airlines in the reopened case, after CAB had denied EAA's application in the transatlantic cargo case. CAB denied a request of Transamerica to broaden its application to include Los Angeles-Europe service via San Jose, Calif., Winnipeg and Guelph.

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SHORTLINES

► **Air Line Pilots Assn.** plans to ask CAB to review its re-employment appeal finding "not crew" the main cause of the fatal Northwest DC-4 crash at Sandport, B. C., if it succeeds in getting the Board to review a similar finding on the fatal Pan American DC-4 crash off San Juan. The CAB expects more aerial insurance refunds of equipment and maintenance but in final blame on the pilot.

► **Air Material Command** may offer 30 C-47s for airline lease as Douglas.

► **Air Transport Association, Inc.**, member of Ames Aircraft Group, CAB accepted its closure sales effort, outpacing Japanese Civil refusal to review the case. ATA can fly military charter only, if letter is issued.

► **Allegany Airlines** has a new CAB certificate, with routes transferred from

its former All American Airlines certificate, new restricted.

► **Boeing Airway's** challenge of the 53 cost fuel two-mile rule into its CAB, effective since the BNF merger with Mid-Continent No. 10 starts a new regulatory case for the period from that date. CAB dispute with Post Office on proper rate for period Oct. 1, 1953, to Nov. 9, 1952, continues. Post Office wants to require Boeing to set up an "average regulatory survey" on the theory that it is a burden against possible revenue that might require payment of a higher rate.

► **Canadian Pacific Airlines** will start jet service between Toronto and Montreal in April 1954 with DC-6Bs from Montreal to Vancouver until 1954, when it plans to open this long leg with the Mark III Constellation.

► **Miami International Airport** has published an air shippers' handbook, quoting rates and charges to start stage flights to U.S. and Latin America from Miami.



DC-7 NEARS FLIGHT

Douglas DC-7 is shown getting its wings in the first aerial photograph of the new line engine aircraft. Dubbed as the "world's fastest piston-powered transport," the DC-7 will have a wing loading speed of 540 mph, and a top speed of more than 490

mph. It is the first aircraft constructed from large quantities of aluminum metal. The transport is more than eight feet longer than the DC-6 and will weigh from 50 to 95 percent. Douglas expects DC-7 to find ready buyers abroad.

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COCKPIT VIEWPOINT

By Capt. R. C. Robson



Pilots and Those AF Crashes

The week's crop of USAF disasters started speculation on what was wrong, why, with military aviation. A congressional investigation, a public be a consumer of gizmos and considerable prior discussion indicated that worldwide, signs would be taken toward a cure. In any event, only some immediate, common-sense on a poor job lock and inadequate radio facilities—have been mentioned.

While these factors undoubtedly need attention they cannot be considered here causes or part of an overall picture. The congressional investigation looked specifically at pilot qualifications but the subject was not pertinent. In fact, gross releases from the Postings quite largely of various military pilots of 30 years and 2,500 hr. experience. One is the basic pattern which has escaped attention.

► **Depends on the Job**—Before copying this thought, it should be mentioned that the Air Force has every right to hang about its pilots. Any 2,500 hr. pilot who can take a long-term flight across the Pacific, or even fly around in the states in winter weather, deserves an award but he shouldn't be allowed to try it again.

A 2,500 hr. pilot may or may not be well qualified. It depends on the job. That length of time around the local airport would produce a good helicopter pilot. In fact, 1,500 hr. is an almost any single-engine pilot is good. As we go up the scale to four-engine equipment, however, 1,500 hr., becomes less experience. According to airline standards, that amount of time on a DC-4 or Constellation would be but an introduction to the plane. For instance, the least-experienced major captain on any airline has over 6,000 hr. and the average time of our pilots flying the Pacific is at 12,000, with 15,000 and 20,000 hr. not uncommon.

► **Four Hours for Captain**—The pilots in command of the ill-fated Air Force planes have TOTAL flying time of about 2,500 hr. Service in individual types of equipment was around 800 hr. Little mention is made of the cockpit or those cases, but it is to be assumed that they had less experience, and it is true they obviously were of little help.

The phrase "10 year experience" likewise can be misleading. Many a golf addict has played for 10 years only to remain deep in the gutter like those of weekend practice calls. Aviation has a similar group—the "weekend warrior." In such other things, a decade of occasional aviation practice is no measure of proficiency and cannot compete with a year or two of constant, regular experience.

► **Major Occupations**—While it may be necessary for military men to spend part of their time on administrative desk jobs, it also is true that command of an airplane like the C-124, carrying some 400 tons of load, is a major occupation. This job should not be considered in merely one step in a man's career, to be accomplished when time permits but rather as a career which requires years of preparation.

There is no question that these 2,500 hr. pilots have performed heroic deeds but neither is there much doubt that they were asked to do. This does not mean that all military pilots need to be as the 10,000-hr. pilot in that weather flying conditions are necessary. But carrying women and child dead, into patients and seldom home for Christmas is hardly a part of time to be an airline operator as it is possible to get and therefore requires approximately the experience as standards.

The Air Force has more well-qualified 10,000-15,000-hr. pilots available with airline experience, but too many of them are at desk jobs. If for some reason these men cannot be used as active pilots, the Air Force should contract itself to run airline operations.

WHO'S WHERE

(Continued from page 11)

is now general manager, represented for New Canada, Montreal, Que.

Joe Hinton has been appointed pilot superintendent of American Aviation Corp., Los Angeles.

Edwin Air Vice Marshal A. C. H. Sharp has joined Sea Electric Corp., Washington, D. C., as assistant director of the Military Division.

Cy Fenn has been named chief assistant national of Life Corp., College Point, N. Y.

Walter H. Hines has been appointed manager of the month's assumed marketing department of General Electric Motor and Converter Division, Hawthorne, N. Y.

Also named to head new developments are Old F. Van, general manager reduction section, DuPont 1, DuPont, manager design section, motor powerplant planning study, and Fred W. Dunlop, general manager civil aircraft and specialty motor and gas turbine department in G.E.'s Prattville, Mass. plant.

Harold M. Patterson has been named manager of engineering of the Cleveland Division's plastics department.

Walter B. Gentry has been appointed director of purchasing for Kaiser Aircraft, Windsor, Calif. Corp.

John H. Kessler, a National Aeronautics and Space Administration civil servant,

C. F. Herbold has been named industrial relations director at Jack and Helen, Inc., Cleveland.

Bruce E. Gayton has been appointed manager of government sales and service for Hudson Instruments, Inc., Millard, Conn.

Wendell S. Walker has been appointed engineering office manager of Engineering and Research Corp., Riverside, Md.

Jack O. Lasker, long-time assistant sales manager of the South West Division, Stewart-Warner Corp., Chicago.

Robert F. Hendon has been appointed general manager of the Electric Regulatory Corp., Norwalk, Conn.

Robert E. Farley has joined Boylston and Co., New York, as general manager of the Western Gas Division.

Charles T. Lanchester has been appointed purchasing agent for Taco Waco Corp., Chicago.

Other appointments: Andrew M. Miller, assistant sales manager; Edward G. Manquardt, chief mechanical engineer; and Charles F. Karch, production manager.

Honors and Elections

Roy Carl D. Hudson has been elected president of the Air Club of Southern California, affiliated with the National Aeronautics Assn.

Dr. Martin A. Fawcett, engineering manager of G.E.'s Milwaukee, Wis. R & E Dept. has been named to fifth position, granted in a new type of fuel regulating system for aircraft gas turbine engines.

George H. Rindler of New York Agency, Inc., Hawthorne, Calif., has been elected chairman of the National Industries Assn.'s space parts committee.

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A business magazine puts that in aggressive, enterprising and truthful can be a powerful ally of any industry, and truth is, that struggle, the role of an industry or business magazine is frequently misunderstood or its potential power for good is underestimated by the very people it helps or could help best.

The most obvious role of the business magazine, of course, is to report the significant economic, technical and political developments without fear or favor. That objective is most often difficult than easy to attain, and the background of Aerospace Week's lead story in its Feb. 9 issue is a case in point. The result, however, was a better informed public and industry, because two companies and their local employees were able to tell the world about their latest fighting planes.

We asked our executive editor, Robert Hetz—who also heads up our Washington staff—to send us an informal play-by-play report of how the first authentic and officially released story on the Douglas Skyraight (FSD) Marine night fighter and its colorful victims got into newspapers all over the world.

Here is Mr. Hetz's memo detailing the work and time involved in turning out a story you probably need in the minutes:

"First tip came from Navy BuAer, where I was shown an unclassified dispatch from Korea stating that FSD night fighters had destroyed two Russian-built jets at night over MGO-Alor. began checking USAF, Marine and Douglas for data on the rapidly growing night action. USAF cooperated with details on B-29 night losses to Red fighters.

"Marines admitted first dispatch from VMF-513 Marine night fighter squadron in Korea had come in unclassified but said a dispatch several days later ordered a stop on it for security reasons. Second dispatch was classified secret so it wasn't distributed to recipients of first dispatch.

"Despite public relations people told me they had been working for months to get the Skyraight story cleared, with no success. Marine headquarters said they felt story should be cleared now since first action had been in November, but Fifth Air Force in Seoul, under which VMF-513 operated, was postponing story.

"I went to USAF Headquarters in Pentagon with queries if night fighters being used to escort B-29s in North Korea, if so, what types used and had they destroyed any Red night fighters?

"Reply from Fifth Air Force said night fighter story was being held up by Marines and Fifth had no objection to publication.

"Showered this to Marines and asked who was kidding who? On same day Naval Aviation News' unclassified edition appeared with mention of two FSD Marine Red night fighter kills in Korea. I told the Marines, USAF and Douglas there appeared to be no legitimate security restriction on story since both Marines and USAF agreed and I intended to publish story in our next edition Feb. 8.

"Gave copy of my story to Marines and requested them to let me know before Feb. 3 if there were any details involving security. On Feb. 3 Marines asked me to delay story for a week. I explained other publications of FSD story in Naval Aviation News and last that briefing officer in weekly Pentagon press briefing on Korea had mentioned FSD shooting down a Red fighter on night escort of B-29. Fortunately, one of the correspondents attending tumbled to the tip but that was just lucky.

"So Marines cabled VMF-513 in Korea on Feb. 4 and a few days before our story could appear—while it was on the press—they released the FSD story in Korea. Reason for 'snooping' Aviation Week was given as 'in the interest of maintaining good press relations in Tokyo.' AP and other wire services wrote story on FSD in action that appeared statewide papers on Thursday, Feb. 5, and Feb. 6.

"Then USAF hurriedly rushed out release on fact that its Lockheed F-96B night fighters were also in action in Korea, thus taking some headlines from Marines. This was a story Lockheed public relations had been trying to break loose for some time.

"Our story appeared Feb. 9 with first real details on the world night battle of MGO-Alor, the other names of pilots and radar operators who made the kills.

"This is just another example of how military security regulations are abused by military authorities to accomplish purposes other than maintaining legitimate military security.

"Defense Department Information Director Andrew Reading, a former AP correspondent who should know better, recently blundered stated that headlines there would be so such thing as an 'exclusive' story on military matters. If a correspondent's query uncovered a good story, he said the military would make the news available to everybody. It is quite evident that the military is justifying what Berlin practices and Pentagon correspondents are being forced to handle competitive stories outside normal information and security review channels as have been handed on a platter to their competitors."

There is still a minority opinion in aviation, although it is diminishing through the months, that the business press serves best that depends most on "offbeat" press releases, company and government lawsuits. The story above presents just one dramatic example among scores of how a powerful business press of integrity can perform a public information service for industry that industry itself cannot perform alone.

—Robert H. Wood

—*Nearest NEWS in Aircraft Manufacture*

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The sheet is Hufford Hydra-Curve sheet jaws are shown in operation. The sheet is being fed into the machine from the left. The machine is shown in operation, and the sheet is being processed.

Just as you can straighten out a bent sheet, you can also straighten out a bent sheet.



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The sheet is Hufford Hydra-Curve sheet jaws are shown in operation. The sheet is being fed into the machine from the left. The machine is shown in operation, and the sheet is being processed.

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With General Electric G-3 flight control, pilot can automatically level off, at high altitude, from a roll maneuver like that shown above

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New advances in autopilots for Navy jets

**General Electric G-3 flight control aids jet performance six ways...
is slated for Navy's new carrier jet, McDonnell F3H "Demon"**

Designed specifically for high-speed jet aircraft, General Electric's G-3 autopilot is now installed in Douglas F3D-2 Skyknights, Grumman F9F-5P Panthers, and the new swept-wing Grumman F9F-6P Cougar. A G-3 autopilot will soon go into the Navy's newest carrier jet—the McDonnell F3H "Demon."

Purpose? The G-3 gives *specialized* aid to a plane's flight performance; performs such jobs as suppression of dutch-roll and high-frequency oscillation. G-3s also

provide continuous automatic synchronization, automatic altitude control, and "level-out" and maneuver holding functions.

If you would like more information on the G-3 autopilot, why not write for bulletin GEA-5741? It's a good idea, too, to talk first with a G-E Aviation Specialist, whether you need stabilizing or complete flight control systems. *Section 210-70, General Electric Company, Schenectady 5, N. Y.*

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